

November • 1951

Finish

METAL PRODUCTS MANUFACTURING

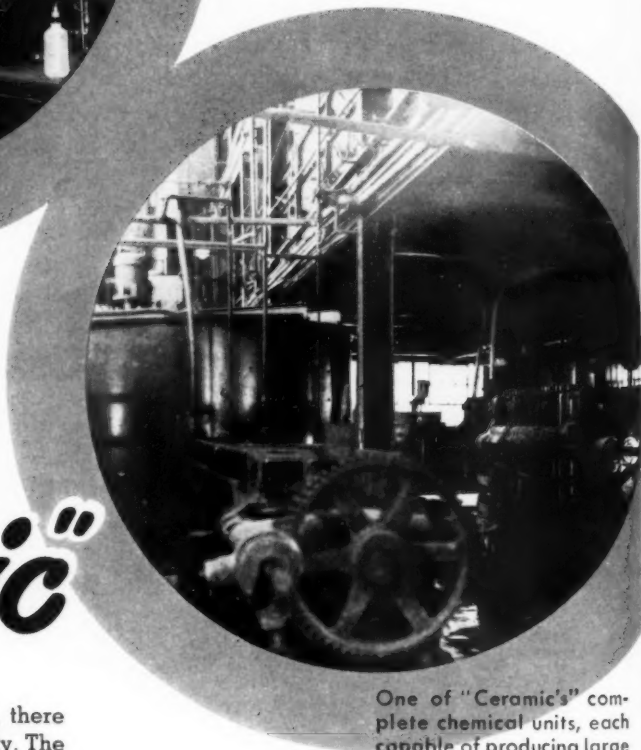
FROM RAW METAL TO FINISHED PRODUCT

no shortage.....in the quality



Each step in the manufacture of "Ceramic" Colors and Chemicals is guarded in this control laboratory.

you get from *"Ceramic"*



One of "Ceramic's" complete chemical units, each capable of producing large quantities of material.

WHATEVER shortages exist or may arise, there will be no shortage in "Ceramic" Quality. The same rigid controls as in normal times are being employed in our chemical laboratory. Test batches are fired under production conditions that duplicate your own. You can put full confidence in "Ceramic" colors and chemicals, for true-to-sample matching, for trouble-free workability.

Every effort is being made to supply the needs

of those who have depended on us in the past. "Ceramic" is actively engaged in testing and processing available material for conversion into usable products. If you have a problem which our experience and specialized laboratory and testing equipment can help solve, you can count with confidence on our full cooperation.



CERAMIC COLOR & CHEMICAL MFG. CO.
New Brighton, Pa., U.S.A.

Need help with
your Defense Contracts?



plan now with MONARCH

for the aid you need in completing your defense commitments on time. Take advantage Today of the specialized experience and engineering knowledge we gained so well during World War II.

With our modern facilities—readily adaptable to defense production—and our peerless engineering “know-how”, New Monarch is ready to assist you in the solution of your most perplexing production problems.

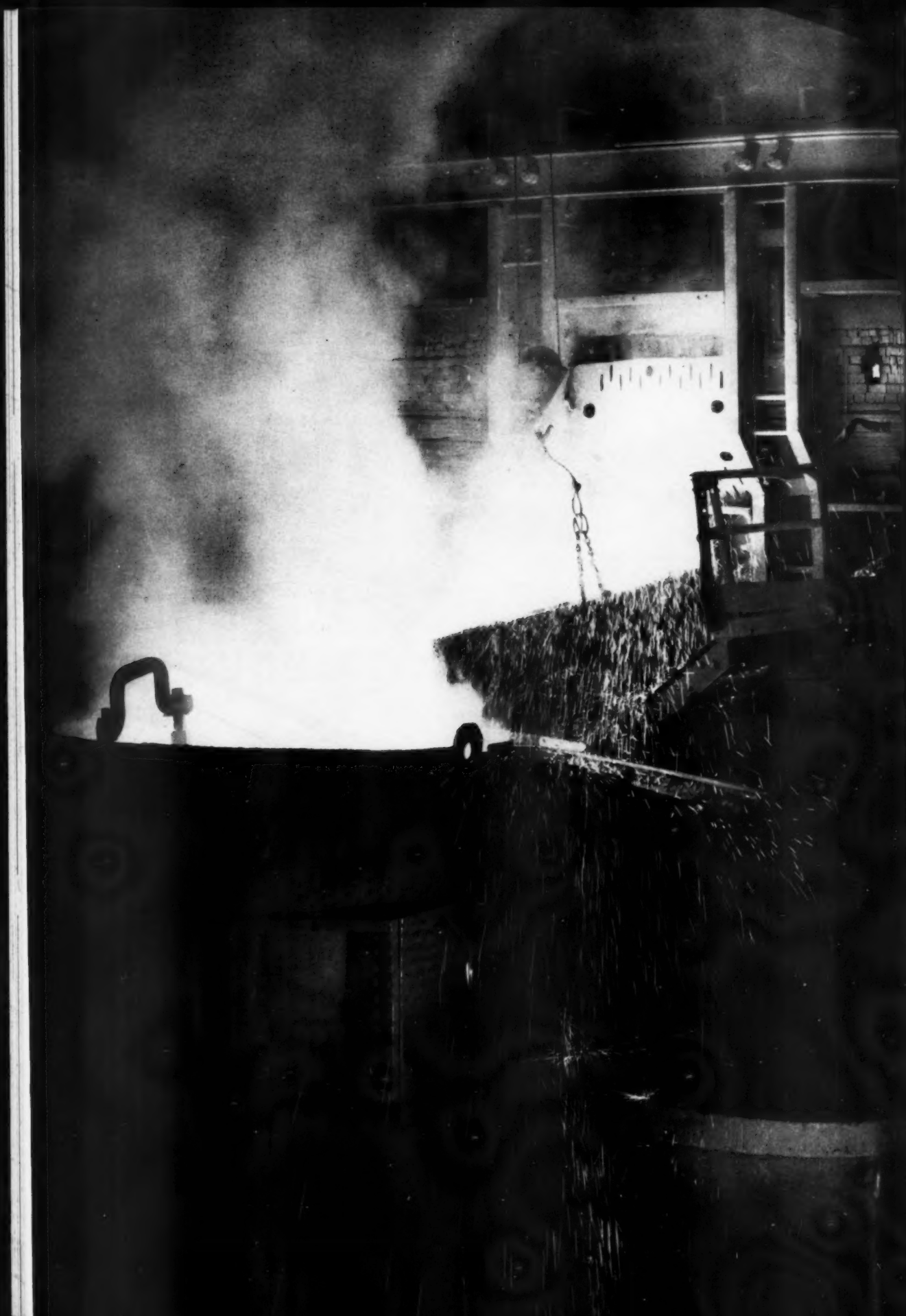
Whether it be a single stamping or a complete assembly requiring dies, jigs, stampings, assembly, finishing and packing, you will find New Monarch's Complete From-Blueprint-To-Shipping-Carton Service invaluable to you.

Write Now or send blueprints for estimate



When you think of Stampings, think of

NEW MONARCH MACHINE & STAMPING CO.
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LINE

ARE YOU BATTLING FOR SCRAP?—

Certainly every **finish** reader has read editorials, feature articles and editorial suggestions in magazines and newspapers concerning the seriousness of the present steel scrap situation. Here are just a few more words to urge ACTION on the part of every reader of our publication.

36,000,000 tons of scrap needed NOW

Charles E. Wilson, Defense Mobilization Director, recently declared that he was "shocked" at this winter's steel prospects.

Manly Fleischmann, Defense Production Administrator, declared that scrap collections may be the key to mobilization and possibly will spell the difference "between victory and defeat".

Bennett S. Chapple Jr., Assistant Executive Vice President, U. S. Steel Company, in a speech before the Pressed Metal Institute, said: "Purchased scrap requirements for the industry this year are 36 million tons. We are meeting those requirements on a hand-to-mouth basis. Instead of a normal 60-day inventory as we go into the winter season, much of the industry is operating with less than a week's supply. In fact, in certain plants, scrap is being unloaded from freight cars directly into the furnaces in order to maintain current operations."

Wirton Steel Company, in a paid advertisement from which the accompanying "SCRAP" illustration was taken, said: "Lack of scrap may cause steel production to sag . . . right when our nation needs more steel than ever. And there's only one way to meet the need: Get in all the scrap that you can, now."

The Youngstown Sheet and Tube Company, in a paid advertisement, said: "It will be impossible for producers to make the steel tonnages demanded for rearmament and essential civilian needs, unless consumers cooperate by furnishing more scrap."

It can and must be done

Robert W. Wolcott, Chairman, Lukens Steel Company and Chairman, Steel Industry Scrap Mobilization Committee, told the Emergency Conference on Iron and Steel Scrap, called by NPA, of a plan to mobilize the manpower of the steel industry to assist in the all-important drive. He referred to the thousands of pages of editorial material in leading trade publications, and to the fact that a large proportion of steel industry advertising in the industrial press is being added to the drive.

"We are determined", said Wolcott, "that the some 2000 local Scrap Mobilization Committees set up by the National Production Authority and the United Chamber of Commerce shall have the help they need to do their job . . .

"In order to expedite the work, 33 leading steel companies have made available to the Steel Industry Scrap Mobilization Committee 2,000 of their top-notch salesmen . . .

"Briefly, here is our plan of action. The 33 leading steel companies and the American Steel Warehouse Association have assumed responsibility for directing this drive. Each has named a senior sales executive . . . as campaign manager for the company in the area assigned to it. Then, the country has been divided into 335 areas, each with a supervisor, an important sales official, responsible for the drive in each of these areas. From these 335 areas will emanate the approximately 9,000 steel and warehouse salesmen into each of the industrial subdivisions of the cities or areas where local Scrap Mobilization Committees have been formed.

"We believe that these steel and steel warehouse salesmen can help assure a nationwide combing of every available resource of scrap . . .

"It is our firm conviction that when American industry is fully alive to our great need, and understands how disastrously the failure to gather scrap could affect all of us, they will put their shoulders right to the wheel and do this job. *It can and must be done.*"

Everyone can help

Scrap round-up reports from business, industry, trade associations, business press, chambers of commerce, and municipalities show increasing activity throughout the country.

Such organizations as National Warm Air Manufacturers Institute, Steel Plate Fabricators, Oil Heat Institute, American Gas Association, Institute of Cooking and Heating Appliance Manufacturers, Packaging Machinery Manufacturers Institute, Association of American Railroads, Farm Equipment Institute, and others have instituted plans for assistance to the round-up.

Every plant served by **finish** is a fertile field for scrap if a thorough scrap search plan is not in effect. Scrap can come from any factory — A few examples: A shirt-making firm turned up 89 tons; Eastman Kodak found 88 carloads; Chrysler found 600 tons in first check of vendor's plants; Seeger Refrigerator Company, St. Paul, found 300 tons of dormant scrap. A news item in this issue tells how Monsanto Chemical Company plans to recover 5,000 to 10,000 tons of scrap from a building site, an old pipe foundry fill.

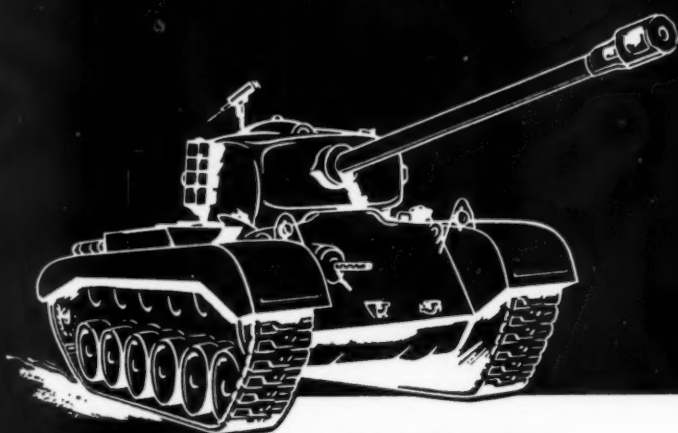
Get that thorough cleanup started now!

If you don't have an organization established within your plant with a plan for immediate and thorough action, start now — for your own interest in a continued steel supply and for the protection of your country's interests.

If you don't have a plan of action available, write to **finish** and we will see that one is sent.

Dana Chase
EDITOR AND PUBLISHER

← ILLUSTRATION COURTESY THE YOUNGSTOWN SHEET AND TUBE COMPANY



Ready
and
waiting
for you
to use--

MACCO... DEFENSE PRODUCTION KNOW HOW ...will help you meet Government Requirements

ALL through the last emergency, Macco Products Company worked hand in hand with hundreds of the nation's small and large prime and sub-contractors--who produced a wide variety of material for all branches of the armed forces...And, out of those associations came a vast amount of high priority technical know-how.

HERE ARE A FEW OF THE OPERATIONS WHERE MACCO GOT ITS KNOW-HOW

<i>Jobs</i>	<i>Operations</i>
Shells, projectiles, rockets--all sizes	Machining, rust-proofing, painting
Cartridge cases--from 50 cal. to 155mm, both steel and brass	Drawing
Tank tread connectors	Machining
Blitz cans	Drawing, cleaning, and phosphatising
Screw machine products	Machining
Jet engine parts	Forging and drawing
Bazooka shells	Machining
Fuses	Machining, cleaning, and plating
Tank parts--transmissions, axles, differentials	Machining, piercing, punching, and shearing

Drawing, cutting, and preparing all types of metals for finishing into aircraft parts, guns, gun carriages, shells and cartridge cases, rockets, tank parts, and similar ordnance products--requires highly specialized know-how.

Macco has it...plus...the various products for performing each operation. The same engineers who acquired that know-how will gladly show you how to meet government requirements--quickly. Wire, write or phone--NOW.

525 W. 76th Street
Chicago 20, Ill.

Phone: Aberdeen 4-3200; 1, 2, 3, 4

MACCO
PRODUCTS COMPANY

Chemical Compounds Inc. the Metal Working Trade--Since 1931

*For more efficient
deep drawing...*

THIS
Version MARK

**DOUBLE ACTION
DEEP DRAWING
PRESS**

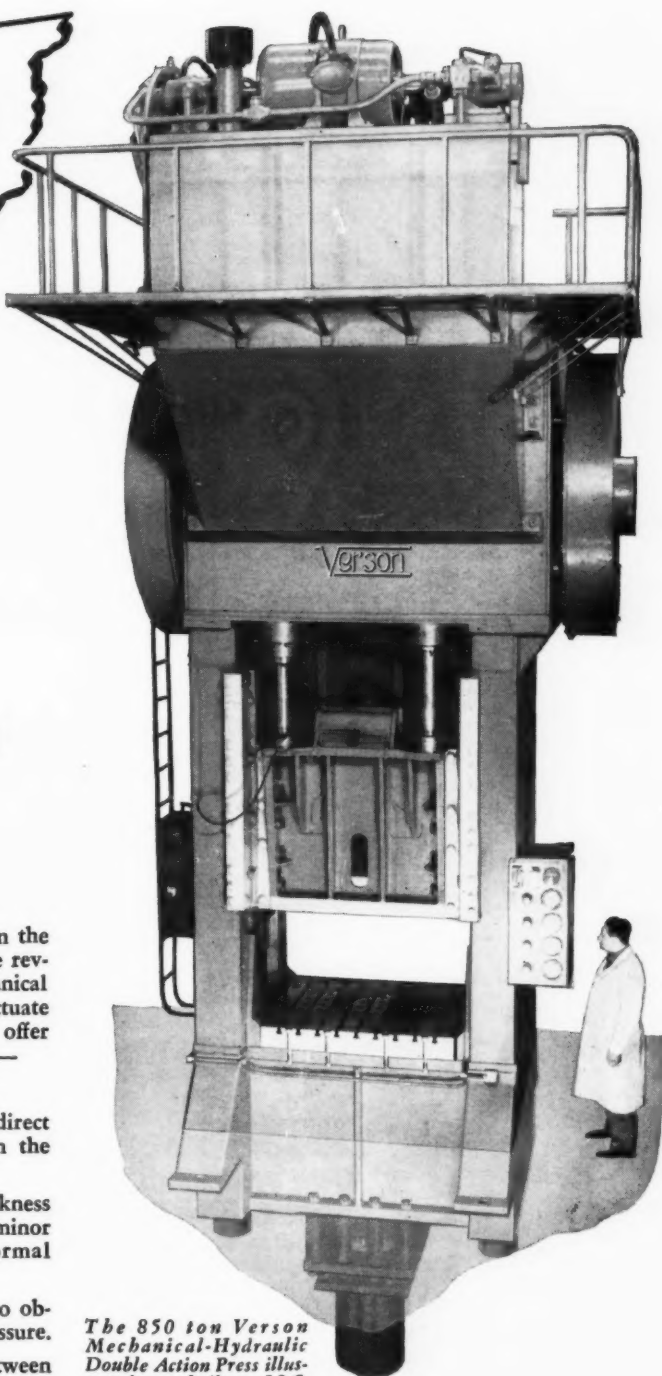
**combines mechanical
and hydraulic
force application**

TYPICAL of what "know-how" can mean in the design and building of better presses is the revolutionary press illustrated. By utilizing mechanical force to drive the ram and hydraulic force to actuate the blankholder, it is now possible for us to offer these important advantages for deep drawing —

- ★ Increased production.
- ★ Instantaneous adjustment of pressure and direct reading gauges for any pressure point on the blankholder.
- ★ Self-adjustment of blankholder for any thickness of stock and automatic compensation for minor variation in stock thickness during normal operation.
- ★ Elimination of need for the use of shims to obtain correct and uniform blankholding pressure.
- ★ Elimination of tool-damaging impact between blankholder, stock and die.

Write for complete details.

*The 850 ton Version
Mechanical-Hydraulic
Double Action Press illus-
trated was built to J.I.C.
standards and operates at
7 strokes per minute.*



Originators and Pioneers of Allsteel Stamping Press Construction

VERSION ALLSTEEL PRESS COMPANY

9320 South Kenwood Avenue, Chicago 19, Illinois

So. Lamar at Ledbetter Dr., Dallas 15, Texas

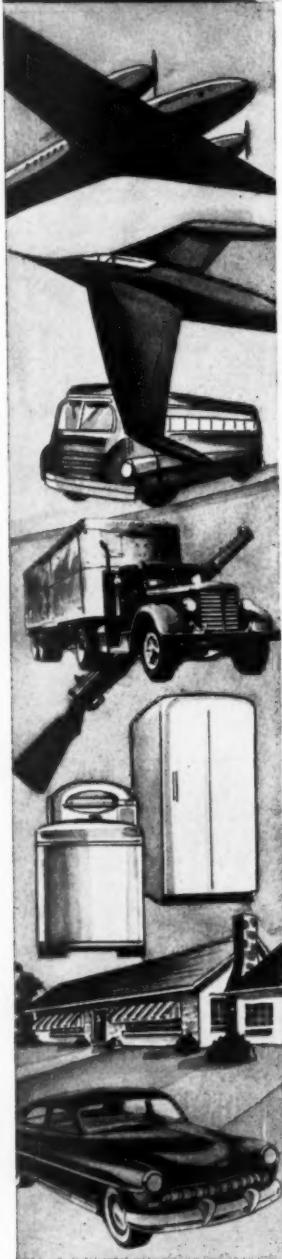
A VERSION PRESS FOR EVERY JOB FROM 60 TONS UP

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES • TOOLING
DIE CUSHIONS • COMPRESSION AND TRANSFER MOLDING PRESSES

CHEMICALS
ACP
PROCESSES

phosphate
coating
chemicals

TO
MAKE
YOUR PRODUCT
DURABLE



PAINT BONDING

"GRANODINE"® forms a zinc-iron phosphate-coating bond on sheet metal products—automobile bodies and fenders, refrigerator cabinets, etc.—for a durable, lustrous paint finish.

"LITHOFORM"® makes paint stick to galvanized iron and other zinc and cadmium surfaces.

"ALODINE"®, the new ACP protective coating chemical for aluminum, anchors the paint finish and protects the metal.

RUST PROOFING

"PERMADINE"®, a zinc phosphate coating chemical, forms on steel an oil-adsorptive coating which bonds rust-inhibiting oils such as "Granoleum."

"THERMOIL-GRANODINE"® a manganese-iron phosphate coating chemical, forms on steel a dense crystalline coating which, when oiled or painted, inhibits corrosion.

PROTECTION FOR FRICTION SURFACES

The oiled "THERMOIL-GRANODINE" coating on pistons, piston rings, cranks, camshafts and other rubbing parts, allows safe break-in operation, eliminates metal-to-metal contact, maintains lubrication and reduces the danger of scuffing, scoring, galling, welding and tearing.

IMPROVED DRAWING AND COLD FORMING

"GRANODRAW"® forms on pickled surfaces a tightly-bound adherent, zinc-iron phosphate coating which facilitates the cold mechanical deformation of steel, improves drawing, and lengthens die life.

Send for descriptive folders and Government specifications chart on the above chemicals. Write or call for more information on these products, and advice on your own metal-working problem.

Pioneering Research and Development Since 1914
AMERICAN CHEMICAL PAINT COMPANY
AMBLER, PA.

Manufacturers of Metallurgical, Agricultural and Pharmaceutical Chemicals

TRAILING THE EDITOR

BY employing cars, trains, planes and boats I have succeeded in trailing the *finish* Editor-Publisher for a few weeks to see what he does with his time. Part of the trail was exceedingly pleasant, part of it gruesome and, taken "all in all", a bit tiring.

The fishing was good

The start of the journey was just what I had expected to find on the



Ely, the FiNNish guide, and Lt. Chase, right, display the afternoon catch.

The Sharps had fish to show too.



editorial agenda. It included a motor and plane trip to Basswood Lodge on beautiful Basswood Lake (Canadian border) for a week's fishing (I had always felt that the "Finish Line" actually meant "Fishing Line"). The party included Jack Sharp, Hotpoint V.P., his two sons John and Dave, Lt. Dana Chase Jr. (on short leave from Army camp) and the Editor.

A week of successful wall-eye fishing can be readily attested by photo-

DEVILBISS



YOU ARE THE ONE WHO BENEFITS

Many manufacturers, in hundreds of industries, are finishing their products faster, better and at lower cost with the help of DeVilbiss equipment. Product improvement through better finishing is typical of DeVilbiss service and quality products—Spray Equipment, Exhaust Systems, Air Compressors and Hose. May we help you?



Clyde Porcelain Steel Co., Clyde, Ohio, sprays light fixtures with DeVilbiss low pressure guns.

THIS DEVILBISS GUN IS REVOLUTIONIZING CERAMIC SPRAYING!

This gun is a DeVilbiss low pressure ceramic spray gun.

With it manufacturers in the ceramic field are saving unheard of amounts. One reports a saving of \$50,000 a year . . . another saves \$3,000 a month.

Why does DeVilbiss low pressure spraying save so much for so many? New DeVilbiss low pressure guns need only 50 lbs. operating pressure

instead of the 70, 80 or 100 lbs. required by old methods—reducing power costs as much as 50%. With low pressure spraying there's far less overspray. Material consumption is often cut as much as 35%.

The operator benefits because guns can be moved more slowly, more evenly. Fewer passes are needed. Thus, operator fatigue is reduced. A high standard of quality is main-

tained over a longer period. There are fewer rejects, less reworking and a lower cost per unit.

Get the facts about DeVilbiss low pressure spraying. Phone our nearest branch office or write us.

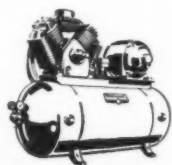
THE DEVILBISS COMPANY

Toledo, Ohio

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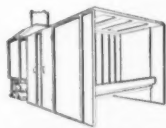
Air Compressors



Hose and Connections



Spray Guns



Ceramic Spray Booths

FOR BETTER SERVICE, BUY

DEVILBISS

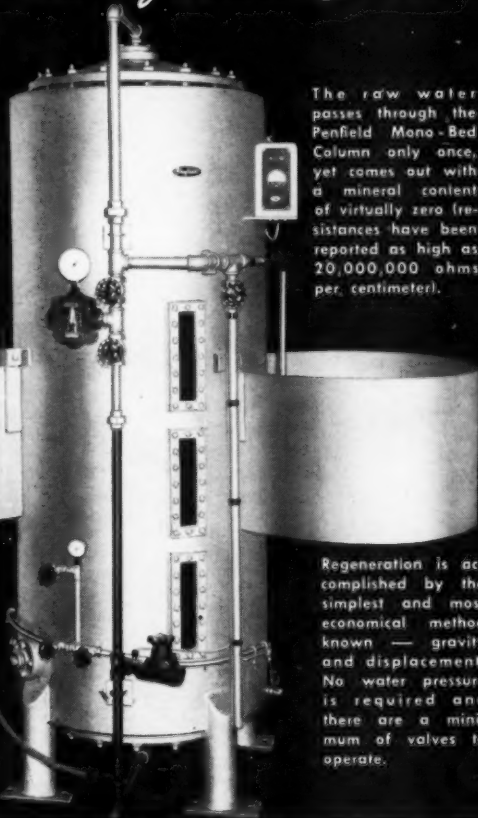


Penfield

MONO-BED DEMINERALIZER

Cuts Deionization Costs

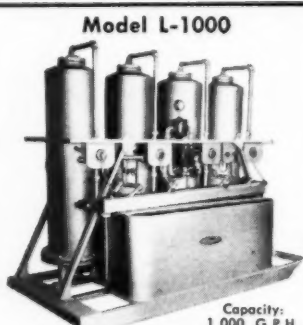
Cation and exceptionally strong anion base exchangers are intimately mixed in a single unit tank, thus providing in one container the equivalent to a large number of "multiple bed systems".



The raw water passes through the Penfield Mono-Bed Column only once, yet comes out with a mineral content of virtually zero. Resistances have been reported as high as 20,000,000 ohms per centimeter.

Illustrated here is the Penfield Mono-Bed Demineralizer, Model No. M-1000, with a flow rate of 1,000 g.p.h. Required floor space for the complete unit is 5' x 2 1/2' x 7'.

Regeneration is accomplished by the simplest and most economical method known — gravity and displacement. No water pressure is required and there are a minimum of valves to operate.



Model L-1000

Capacity: 1,000 G.P.H.

Over the past ten years, Penfield has built more four column demineralizers than any other manufacturing concern. In comparison to distilled water costs, Penfield Industrial Demineralizers provide savings as high as 85% and in one reported instance cut costs 98%. No heat or steam power is ever required and units are ready for immediate operation on arrival at site. Send for "Penfield Pays" folio giving specifications of all Penfield Demineralizing units — single, double and four column.

AVAILABLE IN FLOW RATES FROM 200 TO 5,000 G.P.H. AND UP

The Penfield Mono-Bed Demineralizer operates upon the most efficient deionizing technique known . . . is ideal for a large variety of processing and other operations — including power plants, mirror plating, electronic tubes, photographic finishing, and wherever exceptionally high purity, mineral-free water is required.

Write today, describing your water treating needs.

PENFIELD

MANUFACTURING CO., INC.

19 High School Ave., Meriden, Conn.

FILTERS • SOFTENERS • DEGASIFIERS • DEMINERALIZERS

Penfield "Planned Purity" PAYS!

graphic proof and filled home freezers and storage locker.

That is the kind of trail I like to follow, but I was soon due for a rude awakening, for as we flew out of the northern lake region I began to sense that the "party" was over and that my trail might get tougher.

A one-round fight in Pittsburgh

After running to keep up with various and sundry plant trips and editorial calls from the Chicago office, I was informed that we were headed for Pittsburgh, Pa., for a long overdue editorial and business trip to the city of Steel. We were to have the pleasure of the company of the Publisher's better half for a week or ten-day stay at the William Penn.

Everything was right on schedule until after lunch on Thursday of our Pittsburgh stay. As we left a luncheon appointment to return to the hotel I noticed that the "Boss Man" was decidedly pale around the gills. From noon to midnight Publisher Chase wasn't sure he would live but was very much afraid that he might. (Doctor's diagnosis: virus infection, and orders: stay in bed.)

But — Friday was a new day, and much against my advice the obstinate Editor decided that the "little lady" should drive him up the Beaver Valley to see some good friends of *finish*. He would "take it easy".

Yes — he made it back to Pittsburgh, but a sick man with a blood pressure of 94. Result: a "black-out" which sent 190 pounds of body weight into a nose dive onto a perfectly good (and *hard*) terrazzo floor of the William Penn. A snapshot which I managed to get the next day offers definite proof that you can't break up a terrazzo floor with cheek bones and an eye. The X-rays showed three fractures of the cheek bones, and no X-rays were required to see what happened to an eye.

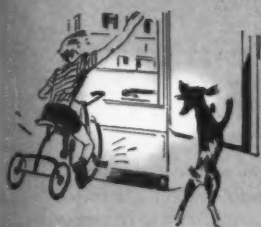
MORAL—when the sawbones says "stay in bed" you are traveling at your own risk.

October — everybody meets

Well, the Editor-Publisher was back on his feet in a week or so, to Page 102 →

NOVEMBER • 1951 finish

WHITE...for life with KEMCLAD![®]



TOUGH AND MARPROOF

Kemclad formulations include special ingredients to protect finish against marring, chipping or scratching.



HOT GREASE? NO HARM DONE!
Even hot grease won't damage Kemclad's gleaming white finish!



STAYS WHITE AND STAIN-FREE!

Kemclad Finishes aren't affected by food acids, weak alkalis, alcohols or other common household chemicals.



CLEANS EASILY . . . SAFELY!

Kemclad's smooth surface cleans easily with damp cloth, but withstands strong detergents safely.



Like other quality-conscious appliance manufacturers, W. R. AMES COMPANY, San Francisco, has found KEMCLAD Appliance Finishes to be the answer in making white cabinets that *stay* gleaming white!

Food acids . . . detergents . . . even hot grease . . . won't mar the lasting beauty of their finish. At the same time, production problems are simplified, too. KEMCLAD provides greater hardness combined with greater flexibility, as well, which reduces rejects . . . enables minor defects to be rubbed out after baking. Extremely high solids content, with low viscosity, enables better protection at lower cost per mil of finish thickness.

Investigate what these newest technical developments in synthetic resin appliance finishes can offer you. Check your Sherwin-Williams representative or write The Sherwin-Williams Co., 101 Prospect Avenue, Cleveland 1, Ohio.

SHERWIN-WILLIAMS

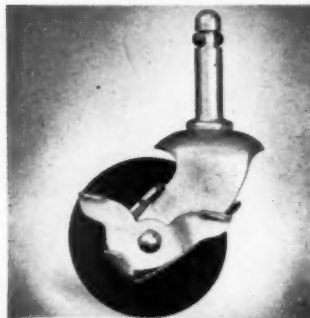
APPLIANCE FINISHES





▲ 2109-11 1 1/2" Pintle Type Caster with hard rubber composition wheel.

▼ 2114-62PH 2 1/2" Pintle Type Caster with plastic wheel and cam brake.



FOR TROUBLE-FREE MOBILITY use NAGEL-CHASE CASTERS

▼ B2614-62P 2 1/2" Swivel Type Caster with strong plastic wheel.



Keep your appliances rolling free — use Nagel Chase Casters. Built in a wide range of sizes from 1 1/8" to 3" dia. and several styles, they have been used by leading washing machine and appliance manufacturers for almost a quarter century.

Nagel-Chase Casters are built with strong plastic and hard or soft tread rubber composition wheels to suit the requirements of practically any mobile appliance used today. Write for illustrated catalog.

NAGEL-CHASE V-BELT PULLEYS FOR BELT DRIVEN APPLIANCES

Nagel-Chase V-Belt Pulleys are made from spot-welded pressed steel and designed so that the pulley cannot come loose from the hub. They are ideally suited for operation with fractional horse-power motors in wringer or automatic type washers or dryers. Use Nagel-Chase Pulleys for all your belt driven appliances.

Write for complete information today!

THE NAGEL-CHASE MANUFACTURING COMPANY
2811 N. Ashland Avenue, Chicago 13, Ill.
SPECIALISTS IN CASTERS AND PULLEYS FOR NEARLY A QUARTER CENTURY!

Which of your metal-cleaning jobs would you like to improve?

OAKITE PRODUCTS, INC.

Tell me (without obligation on my part) about Oakite methods and materials for the following jobs:

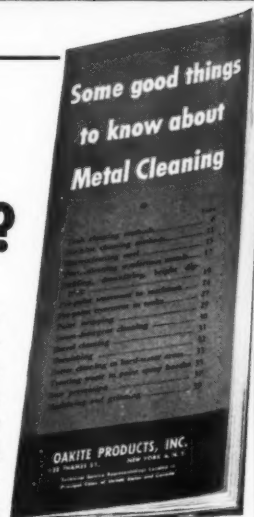
- | | |
|---|---|
| <input type="checkbox"/> Tank cleaning | <input type="checkbox"/> Paint stripping |
| <input type="checkbox"/> Machine cleaning | <input type="checkbox"/> Steam-gun cleaning |
| <input type="checkbox"/> Electrocleaning | <input type="checkbox"/> Barrel cleaning |
| <input type="checkbox"/> Pickling | <input type="checkbox"/> Burnishing |
| <input type="checkbox"/> Pre-paint treatment | <input type="checkbox"/> Rust prevention |
| <input type="checkbox"/> Send me a FREE copy of your booklet "Some good things to know about Metal Cleaning." | |

NAME

COMPANY

ADDRESS

Listed here are some of the operations discussed in Oakite's new 44-page illustrated booklet on Metal Cleaning. Please check the list. Then let us show you how Oakite materials and methods can give you better production with greater economy.



SPECIALIZED INDUSTRIAL CLEANING
OAKITE
MATERIALS • METHODS • SERVICE

OAKITE PRODUCTS, INC., 17 Thames St., NEW YORK 6, N. Y.
Technical Service Representatives in Principal Cities of U. S. & Canada

It's as easy as this ...



Another range with a PERMA-VIEW window. It is the product of Gray and Dudley Company, Nashville, Tennessee.

PERMA-VIEW

... THE WINDOW YOU CAN SEE THROUGH *Always*

The easy, economical method of offering "visible baking" as a sales feature for your range is to use PERMA-VIEW oven door windows.

The strong steel encased, double pane PERMA-VIEW window incorporates the finest quality heat resisting glass. It is mechanically sealed to prevent infiltration of vapors and to keep the window "clear" permanently.

PERMA-VIEW is the fastest growing feature in the range field today. We can work with your engineering department and you can offer this feature on *your* range in a very short time. Call or write today.

MILLS ENGINEERING COMPANY
3683 EAST WILLIS DETROIT-7-MICHIGAN



*"Let's try it without the
stretcher levelling," said Art*

For some time, an Inland Customer, who makes farm implements, had been buying 62½" x 128" sixteen gage cold rolled sheets for a certain part and had always specified that they be stretcher levelled and resquared to insure extra flatness.

The process of stretcher levelling and resquaring at the mill added substantially to the cost of the cold rolled sheets. Art Brackett*, the Inland sales representative on this account, questioned the need for this costly operation.

One day, on a visit to the customer's plant, he asked to take a look at the part being fabricated from this large sheet. He found that the stretcher levelled and resquared sheets were shipped from Inland to an independent fabricator for blanking. They were then shipped to Art's customer who further fabricated them and welded on bracing and framing sections before assembling them on his implements.

In talking to his customer's purchasing agent and production manager, Art suggested that the extra flatness achieved by stretcher levelling was lost by the time the sheet was assembled on the finished product and was, therefore, unnecessary. The customer changed his steel specification for this part, eliminating stretcher levelling and resquaring.

Result: A saving for Inland's customer of over \$4.00 per implement—a saving that has already run into thousands of dollars! INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago 3, Illinois.

**Names used are fictitious*

Your Scrap Is Needed by the Steel Industry for National Defense

**Making Steel
Do Your Job Well
Is Inland's Job.**



Finishing operations at Maytag

describing the equipment and operations for both organic and ceramic finishing of components for washing machines, plus information on treatment for aluminum

third in a series

by *R. C. Thompson*

SUPERINTENDENT, FINISHING DEPARTMENT, THE MAYTAG COMPANY, PLANT NO. 2, NEWTON, IOWA, AS TOLD TO *Dana Chase*

Finish

Following fabrication, all parts for the Maytag automatic washing machine are transferred to a transportation conveyor which delivers them to one of two complete cleaning machines, depending upon the type of finish to be applied.

Parts to be porcelain enameled include two tubs (outer tub basin and spinner or inner tub), one circular strainer (33 $\frac{3}{4}$ " diameter) and a tub supporting ring.

All other parts get paint finishes, the type depending upon their location in the machine. Fourteen components in all get paint finishes, varying from the outer cabinet (base frame) and lid to small parts such as springs, filler spouts and lid handles.

PORCELAIN ENAMELING

Fabricated parts for porcelain enameling are transferred from the transportation conveyor to the conveyor of the cleaning and pickling machine at the outer edge of the

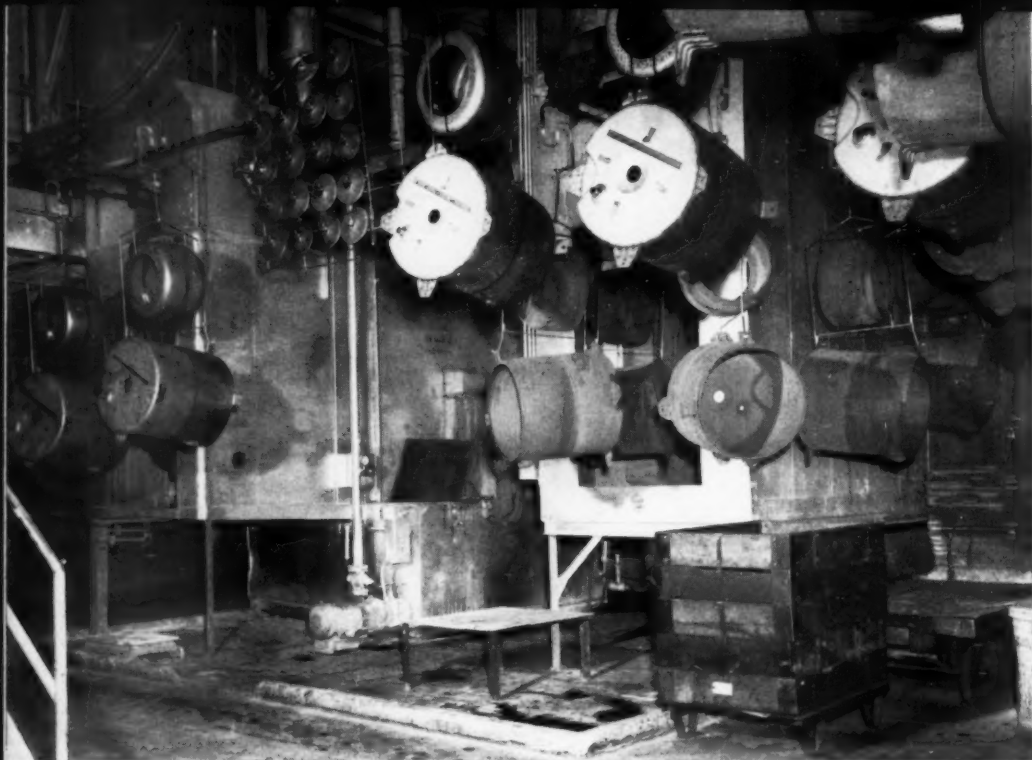
plant's enamel department section.

Ten-stage cleaning machine

The pickling machine is of the U design, having 200 feet of travel. The

ROBERT C. THOMPSON





Left: Entrance and exit of continuous pickling machine shows some of the varied shapes that are processed through the porcelain enameling department.

finishfoto

conveyor length totals 400 feet.

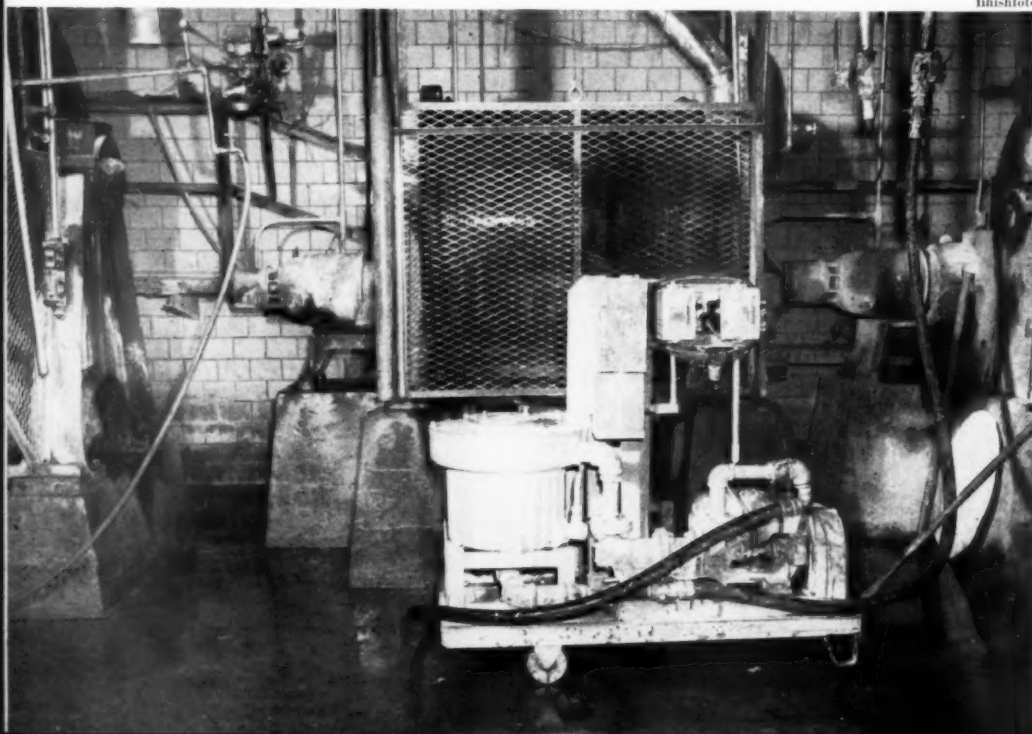
The machine is a ten-stage unit consisting of the following stages: First three stages — alkali cleaning; fourth stage — hot water spray rinse; fifth stage — sulphuric acid; sixth stage — cold water rinse (overflow); seventh stage — nickel flash; eighth stage — cold water rinse (overflow); ninth stage — neutralizer; tenth stage — dryer.

Tank arrangement

The first cleaner tank is set at $\frac{1}{2}$ oz. per gal. to operate at 200°F. Tanks two and three are set at $\frac{1}{4}$ oz. per gal. to operate at 180°F. The fourth tank (hot water rinse) operates at 160°F. The sulphuric acid tank is an 8 to 10% solution operating at 150°F. Both tanks six and eight are designed as overflow rinse tanks (cold). Actually, tank eight

operates at about 120°F. as a result of carry-over heat from the ware as it leaves the nickel tank. The seventh tank (nickel) is set up at $\frac{1}{3}$ oz. per gal.—single nickel salts at a pH of 3 to 3.5. The tank operates at 160°F. The ninth tank (neutralizer) is a soda ash-borax solution consisting of 3 ash—1 borax with a concentration of $\frac{1}{10}$ oz. per gal. Temperature is 160°F. Steam coils are em-

finishfoto



Left: This small section of the mill room shows one of the portable units for unloading, including magnetic separator, pump and accessory equipment.

Right: Large paint spray room is supplied with filtered air replacing 125,000 cfm. Large reclaiming pits are located under center floor sections.



ployed to heat the dryer with a high capacity blower used to recirculate the air. A smaller secondary (intake) fan pulls in 10% outside air or plant air, as desired, through filters.

Drain stages between tanks in the pickling machine are divided by "dams" to prevent flow back.

Acid and surrounding water rinse tanks, as well as surrounding sections, are all rubber lined, and spray noz-

zles are of carbon block. Headers, pipes, etc. are machined carbon. The acid tank is heated with a carbon pipe steam heat exchanger.

The nickel tank is of sheet Monel metal with a built-in Monel steam heating coil.

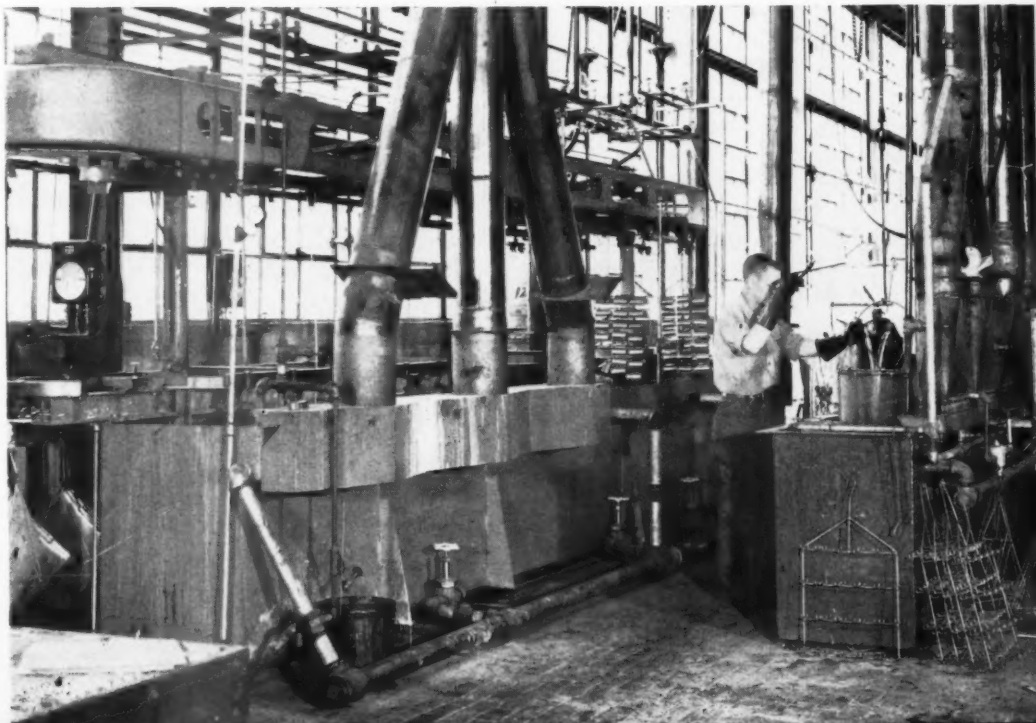
Application and firing

As the conveyor chain leaves the pickling machine it drops to dip tank

level, where the outer tubs, circular strainers and supporting rings are dipped in ground coat and transferred to feed chain for a 240' dryer.

The dryer is heated by a furnace recuperator and automatic auxiliary steam heat. The dryer is equipped with a large fan for recirculation and a smaller exhaust fan to dissipate moisture. In design the dryer is similar to a paint oven.

Right: Important equipment in finishing process is automatic plating machine installed near the paint and porcelain enameling departments. All aluminum parts are processed here.





Left: Spraying the inner (spinner) tub for the Maytag automatic washing machine.

The oven conveyor returns the ware to floor level, where it passes through a reinforcing spray booth and then to the loading point for the furnace chain.

In the meantime, perforated spinner (inner) tubs are unloaded from the pickle machine conveyor by a dipper's helper and placed on a gravity floor conveyor feeding the ground coat spray booth. Following spraying, the spray helper loads spinner tubs direct from the spray booth to the furnace chain. About 20% of the ground coated ware is loaded direct (wet) to the furnace chain.

Fired ground coated ware flows from the furnace conveyor loop to a belt conveyor for inspection. Minor stoning is handled on the conveyor but any major repair jobs go to a special repair section. Okayed ground coated ware is transferred to a conveyor feeding a pressurized room for spraying.

Pressure room for cover coat application

All cover coat spraying and the spinner tub spraying is accomplished in a 5000-square-foot pressurized room.

Cover coat spraying is in dry booths with a water curtain behind the ver-

tically slotted dry back panels. Exhaust dust is virtually eliminated.

Cover coat sprayed ware travels through the same overhead dryer as described for ground coat. The ware, however, travels on a separate conveyor, and the common dryer is partitioned to separate the ground coat and cover coat sections.

Right: Section of milled enamel storage room shows agitator type storage tanks.



The dry finish coat returns to floor level and through a brushing booth, then is hung on the furnace conveyor.

The entire porcelain enameling department is exceptionally compact, and the flow plan and conveyor system is laid out to practically eliminate wasted steps or lost motion on the part of the operators.

Enameling materials and handling

Incoming frit and other raw materials are unloaded from cars or trucks to skids which are in turn transferred by electric floor trucks to an overhead air hoist, which serves as an elevator for raising the materials to the second floor storage room over the mill room.

Mill batches are mixed in hoppers which are designed to hold a complete mill charge. Mills are loaded from the overhead storage room through enclosed chutes.

Mills consist of 3—2000 lbs., 2—600 lbs. and 1—250 lbs.

Both zirconium- and titanium-type enamels are used, the zirconium type for automatic (spinner) tubs and the titanium for conventional-type tubs.

Zirconium enamels are normally fired at 1530°F. with a chain speed of 14½' per min. Titanium enamels are fired at 1540-1560°F. with a

1	2	3	4	5	6
4240 gal	2460 gal	2260 gal	4240 gal	2260 gal	2260 gal
EMULSION CLEANER	HOT WATER RINSE	HOT WATER RINSE	PHOSPHA- TIZING	COLD WATER RINSE	CHROMIC ACID
160°F	150°F	140°F	130-135°F	RM TEMP.	140°F

Tank arrangement for six-stage cleaning and phosphatizing machine.

chain speed of 11-12' per minute. Ground coat is fired on the same chain with cover coat in both cases. In order to accommodate the two types of cover coat at the required differential in firing temperature, zirconium enamels are fired on the day shift and titanium enamels at night. A slightly softer ground coat is used for dipping than for spraying.

Pressures used for sprayed enamels are as follows:

Ground coat: 15 lbs. fluid, 70 lbs. air
Zirconium: 25 lbs. fluid, 80 lbs. air
Titanium: 12 lbs. fluid, 80 lbs. air

Water conditioning

All water for mill room use is conditioned by demineralizing equipment to control mineral content and assist in enamel slip control.

A dust collector, used at the point of loading a mill, adequately handles the dust problem.

When enamel slip is unloaded from the mill it is pumped through a magnetic separator (closed type) to overhead storage tanks located in a con-

trolled-temperature room. There are eight 400-gallon tanks with automatic mixers set to operate on 5 minutes/ off 5 minutes.

From storage tanks enamel flows by gravity through centrifugal sieves and magnetic separators (open type) to dip tanks or to 60-gallon pressure tanks. Dip tanks are recirculating with magnetic separation in the system. Pressure tanks are mounted on rubber-tire dollies.

All finished and inspected enamelled parts are loaded on a service conveyor in sets for storage prior to assembly. This conveyor utilizes space at the mezzanine level.

ORGANIC FINISHING

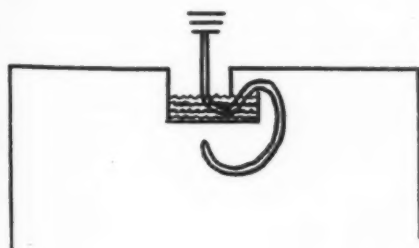
Preparation of the fabricated parts requiring paint finishes is accomplished in a 200' straight-through cleaning and phosphatizing machine located at mezzanine level.

Phosphatizing used

A six-stage machine includes: First stage — emulsion cleaner; second and third stages — hot water rinse;

Design of roof showing water trough around conveyor hangers to serve as vapor stop. Water is supplied from third alkali stage.

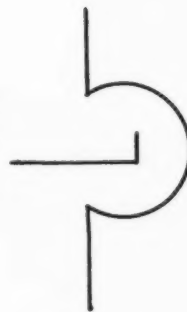
Drain stages between tanks in the pickling machines are divided by simple dams of type to prevent flow back.



Tank arrangement for ten-stage unit for automatic cleaning and pickling machine in porcelain enameling department.

1	2	3	4	5	6	7	8	9	10
425 gal	1110 gal	1425 gal	1110 gal	2375 gal	1110 gal	2375 gal	1110 gal	1110 gal	
ALKALI CLEANING			HOT WATER SPRAY RINSE	ACID	COLD WATER RINSE	NICKEL	COLD WATER RINSE	NEUTRA- LIZER	DRYER
200°F	180°F	180°F	160°F	150°F	RM TEMP.	160°F	RM TEMP.	RM TEMP.	

Conveyor
detail
through or-
ganic fin-
ishing spray
booths.



fourth stage — phosphatizing; fifth stage — cold water rinse; sixth stage — chromic acid.

Tank arrangement

The emulsion cleaner is set at 1% by volume. Cleaner is added each

Editor's Note:

This represents the third in a series of articles describing manufacturing and handling facilities for producing the Maytag automatic washer. Background data on Maytag appeared in September, and details on the fabrication department in October.

A later issue will describe flow coating operations in Plants 1 and 2.

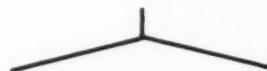
Another future article will describe materials handling, packaging and shipping operations.

hour, based on square feet of ware being run.

The phosphatizing tank is maintained at a ratio of 1:12 free acid to total acid with 15 points total acid by titration.

The chromic acid bath is maintained at 0.8 free acid with a pH of 3.5.

As the parts leave the cleaning and to Page 71 →



HD-N

Cuts Cleaning Time

Cowles HD-N Cleaner, the *new* heavy-duty soak cleaner for ferrous metals, will often do in 10 minutes what it takes other cleaners 30 minutes or more to do. It is specifically formulated as a straight or barrel soak for precleaning before plating, enameling, pickling, painting, back-shop reconditioning—or anywhere a heavy-duty cleaner is needed to remove stubborn types of soil.

The latest developments in metal cleaning research have been incorporated in HD-N to assure maximum detergency under all conditions of usage.

HD-N may also be used on such active metals as brass and zinc, if some attack is acceptable.

HD-N penetrates and removes such soils as oil, carbon, grease, drawing compound, graphite, road and shop dirt in *one* cleaning operation. It is fast, thorough, and does a complete job . . . is readily and completely soluble in hot water.

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How a modern organic finishes laboratory functions

describing the equipment and operations of a laboratory designed to improve industrial finishes and finishing techniques and to offer preventive and corrective service

by *C. O. Hutchinson* • TECHNICAL SERVICE DIRECTOR, NUBIAN INDUSTRIAL DIVISION
THE GLIDDEN COMPANY, CHICAGO

DESCRIBING the equipment and functions of a modern organic finishes laboratory, I will use as an example the recently completed laboratories of the Nubian Industrial Division, which are housed in a three-story building devoted exclusively to laboratory facilities.

The laboratory described is designed for solving any problem concerned with organic finishes, from control testing raw materials to the application of new coatings under production-like conditions.

On the first floor, the raw material and quality control department works with instruments of all types to maintain the rigid specifications. A whole section of this department tests finished products, by the use of such equipment as salt spray cabinets, hu-

midity cabinets, weatherometer and concentrated artificial sunlight units. In many cases, where necessary, special equipment is designed. Other physical tests include abrasion, scratch and impact resistances, tensile strength, bend tests, hardness and flexibility.

On another part of the first floor is the Paint Research Department. Here, by selection from innumerable vehicles, pigments and other materials, the formulators "design" coatings to fit the customer's requirements.

On the second floor, a research staff is dedicated to the important task of developing new resins and varnishes for use as such or in enamels, primers, lacquers, etc. Amid a maze of special glassware and equip-

ment, a separate group attacks long range resin research where no material is too new nor process too complex. Here the endless combination and permutation of modern resin copolymer chemistry is evident.

Pilot plant operations precede production

In order to determine practical means of making new resins and varnishes, a pilot plant has been installed in one section of the second floor. This includes a 15 gallon Dowtherm jacketed kettle equipped for operation under pressure or vacuum. Special condensers and water separators make azeotropic dehydration possible. The use of cooling coils permits the degree of polymerization to be controlled by dropping the tem-

Baking ovens in the pressurized baking and spraying rooms in the laboratory's technical service section.





Left: A view of the research section of the Nubian laboratory. The lab is designed for solving problems concerned with organic finishes.

perature at the proper time from 450° F. to 150° F. in fifteen minutes. Success of a pilot plant batch is followed by a 1000-gallon factory run under laboratory supervision.

The Service Laboratory, which covers the entire third floor, brings to reality the problems of production. The sole purpose of this department is to serve the finish user and act as a liaison between the Research Laboratory and the user plant.

The Service Laboratory staff consists of men who have actually run production plants. This practical experience, along with laboratory background, qualifies them to handle all finishing problems.

Some of the latest types of modern equipment are in use for super-

heated steam spraying, electrostatic spraying, hot synthetic, infra-red gas or electric baking, flow coating, dipping, spraying, swirling, and various other types of application.

Production equipment duplicated

The Service Laboratory itself has actual equipment to duplicate production, such as its own paint circulating system with exaggerated sharp turns and angles with lengths of pipe that can be easily removed for periodic checks to eliminate any possible chance of paint's clogging or of a build-up in the system. It has a large production gas-fired oven with panelboard controls that can be quickly regulated to give the exact air rate and temperature desired. An

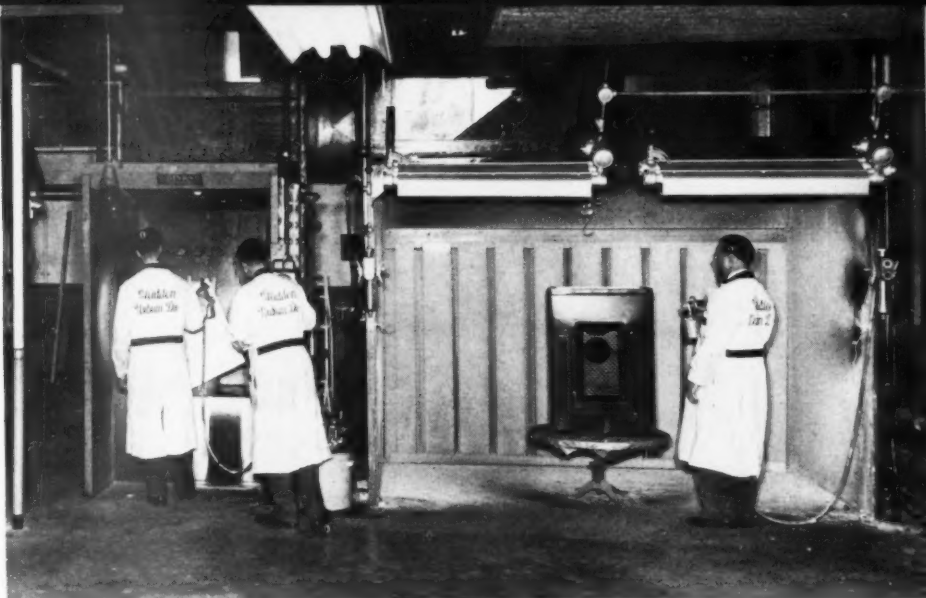
infra-red electric oven and many conventional electric ovens, a super-heater for steam spraying, and steam guns made by various manufacturers are also on hand. Both dry and water washed spray booths are available. The collection and reclaiming of test batches of sludge is also done here. A complete five-stage metal cleaning and phosphate treating system is available.

When calling on production plants, the service man may take any of the numerous available instruments, such as traveling oven recorders, pyrometers, stop thermometers, temple sticks and other temperature and humidity recorders. Each of these has a definite place in checking various ovens. Then there are gloss-meters,



Left: Shown is some of the equipment in the research section which is used for the polymerization of resins.

Right: Showing spraying equipment used to duplicate actual production equipment. Both dry and water washed spray booths are available.



film thickness gauges, cups of various types for viscosity readings, light and heavy Baume bulbs and air volu-meter for checking air velocity in spray booths and ovens. Stop watches determine conveyor speeds, viscosi-ties or flow of gallons per unit of time. Along with the above, special jobs call for extra pressure tanks, paint heaters and various types of veiling, spatter, flock, "dum dum" and touch-up guns. Also available are various types of production guns that have internal, external, suction or pressure heads.

Filtered air for pressurized finishing department

The laboratory itself is subdivided with glazed partitions into well light-

ed rooms and hallways. A special workroom provides a space for the serviceman to give a production part or panel a cleaning or pretreatment before finishing. This part may be terneplate, cold rolled, hot rolled, bonderized, galvanized or just plain steel. It may be cast aluminum, zinc, bronze, etc. The well supplied stock-room offers reducers and other addi-tives for preparing the coating ma-terial. When ready, the serviceman brings everything into the spray room where all entering air is filtered and a constant pressure maintained to prevent dust seepage. The part is finished and baked without leaving this room.

In the Service Laboratory office each serviceman is assigned a desk,

where his clerical activities include reports on work done in the labora-tory and service work done in pro-duction plants. A dictaphone is avail-able for his convenience.

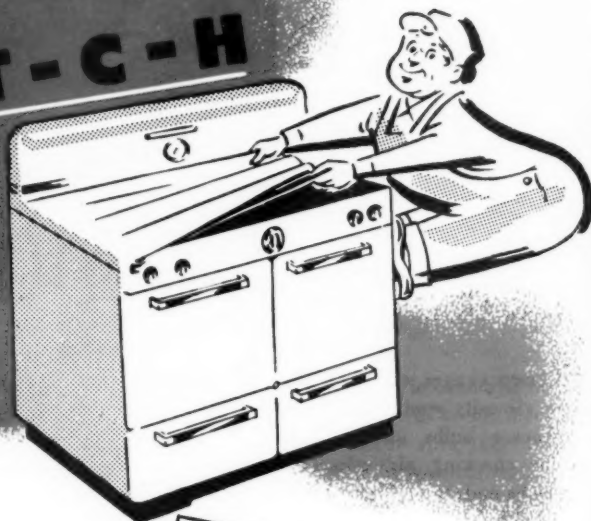
A large conference and display room enclosed in glass paneling is used for meetings and discussions with finishing plant men and for intra-company conferences.

The technical service director's of-ice collects the reports and data from all laboratories, thereby assuring an accurate and direct answer to any specific problem. This department performs both corrective and preven-tive service in production plants. The preventive service is designed to fore-stall trouble before it starts.

Right: Also located in the three-story building is the technical service department where organic finishes are tested.



How to S-T-R-E-T-C-H YOUR PORCELAIN ENAMEL



New FRIT ALLOWS FULL PRODUCTION

Without Lowering Inspection Standards

The NPA order effective recently, sharply curtailed the use of cobalt oxide and nickel oxide. This means that lesser amounts of the ground coat frit formerly used are now available for non-defense purposes. However, a new *non-strategic* frit developed through years of research by the O. Hommel Company in conjunction with the fellowship at Mellon Institute makes possible full production without lowering inspection standards. Containing reduced percentages of cobalt and nickel oxides, this non-strategic frit has *all the desirable properties* of other frits. In fact, tests indicate the new frit is in some respects superior.

Non-strategic frits blend in any proportion with other standard frits, simplifying storage problems. It is important to note, also, that non-strategic frits do not require any special additions in the mill.

Let the O. Hommel Company sales and service engineers show you the results which can be obtained with this new frit.

Advantages OF NEW NON-STRATEGIC FRIT

- Normal Production
- Conformity To NPA
- Inspection Standards
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- No Mill Additions
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Ceramic coating makes the "BIG TIME" in the aircraft field

Ryan announces first production orders for ceramic coated parts to be used on many of the leading planes in current production



Ryan Aeronautical Company, San Diego, Calif., has announced the first volume production contracts for ceramic coating of exhaust systems of modern aircraft to conserve growingly scarce strategic alloys.

Approximately 600 sets for PRATT & WHITNEY engines, including spares, for the CONVAIR Model 240 and Model 340 transports will be ceramic-

coated, Sam C. Breder, Ryan customer service director, reported.

In addition, BOEING Airplane Company, Seattle, has ordered ceramic-coated Ryan exhaust assemblies for all its B-50 BOMBERS and C-97 STRATOFREIGHTERS under production for the Air Force.

In the jet engine field

GENERAL ELECTRIC has given Ryan experimental orders for ceramic coating of the transition liners and inner combustion chambers Ryan manufactures for the J-47 engine.

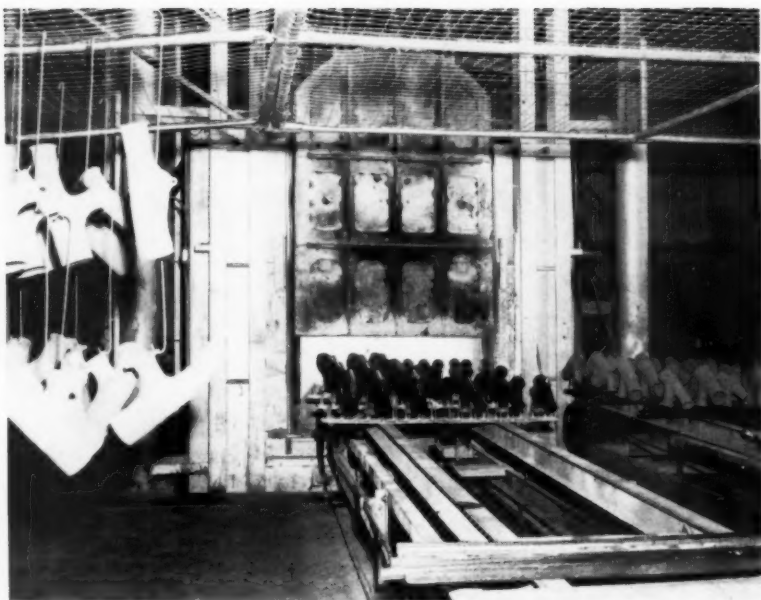
G. E. has launched a program of using non-strategic materials on its famed J-47 engine, which will require ceramic coating for protection.

Experimental work also is being conducted with DOUGLAS Aircraft Company and UNITED AIR LINES on ceramic coating of DC-6 TRANSPORT exhaust stack assemblies, through service tests on actual scheduled runs.

And on the ground, CONTINENTAL MOTORS Corporation's 825 h.p. engine for the GENERAL PATTON TANK, will have ceramic-coated sections on the new manifolds due to get into

View of the production area in the Ryan Aeronautical Company plant where flanges are fitted to the ceramic coated exhaust components prior to shipment to Pratt & Whitney.





Ryan ceramic coated exhaust sections being removed from box type furnace at California Metal Enameling where the ceramic is fired at 1850° F.

production soon at Ryan.

Ryan is the only aircraft company in the country providing ceramic coated parts for piston engines on a production basis, Breder pointed out.

Pioneering work in this field dates to World War II, when portions of more than 500 complete exhaust systems for the Douglas A-20 attack bomber were given thick porcelain enamel coatings. A low carbon steel was used then because of a critical shortage of stainless steel.

The new coatings are "thin"

Today's ceramic coating, applied to the "hot spots" of the engine—the exhaust system—to increase its life by enhancing its resistance to heat and gas erosion, is only one thousandth to three thousandths of an inch thick and adds little to the weight, a vital factor in aircraft, Breder said.

Importance of this technique has increased since World War II, with engines generating temperatures of 2000 degrees and more, at the same time the Air Force is asking manufacturers to use high heat-resistant strategic alloys as little as possible.

The first service tests of ceramic coatings since World War II were conducted in a PAN AMERICAN WORLD AIRWAYS' giant BOEING 377 STRATOCRUISER on the trans-Pacific run.

After more than 1800 hours service, examination showed that the ceramic coated exhaust systems had so resisted heat and erosion that Boeing decided to equip its entire fleet of Stratocruisers with ceramic-coated exhaust parts as replacements are made. These transports are flying for NORTHWEST AIRLINES, BRITISH OVERSEAS AIRWAYS CORP., UNITED AIR LINES and the MILITARY AIR TRANSPORT Service, as well as Pan-American.

W. S. Cockrell, left, chief of Ryan development laboratories, and T. C. Hacker, Ryan exhaust systems engineer, checking ceramic thicknesses on a coated exhaust system. Shown is a complete set of exhaust sections.



Editor's Note:

Finish has informed its readers of all important developments in the field of high temperature ceramic coatings.

Among the earlier articles published were: "High Temperature Ceramic Coatings," by D. G. Bennett, December 1946; "Ceramic Coatings for Steel in High Temperature Service," by W. N. Harrison, D. G. Moore and J. C. Richmond, February 1947; "Using Ceramic Coatings for Specialized Applications," by Walter Rudolph, April 1950; "High Temperature Resistant Ceramic Coatings for Iron, Steel and Alloy Metals," by D. G. Bennett, January 1951; and "New Ceramic Coatings for Jet Engine Parts," by Gilbert C. Close, October 1951.

The following article, "Ceramic Coatings for the Hot Spots," has been held for some time for publication coincident with this announcement of actual production contracts. It offers background information leading to this current announcement. →

On the Convair Model 240, the ceramic coated exhaust systems will replace the non-coated parts of planes in service for AMERICAN AIRLINES, PAN AMERICAN WORLD AIRWAYS, WESTERN AIR LINES, CONTINENTAL AIRLINES, MID-CONTINENT AIRLINES and NORTHEAST AIRLINES. The ceramic-coated exhausts will go into the new Model 340 Convair Liners as they are built in San Diego.

Ceramic coatings for the "HOT SPOTS"

background information and service test data on the ceramic coatings

by *Wilson G. Hubbell* • ASSISTANT CHIEF OF DEVELOPMENT LABORATORIES, RYAN AERONAUTICAL COMPANY

CERAMIC coatings are beginning to play a vital, industrial role in modern high-performance aircraft.

During World War II, when metallurgists were confronted with the

need for saving such strategic materials as high grade, heat-resistant alloy steels, ceramic coatings were applied to increase thermal efficiency while using low carbon steels.

At Ryan Aeronautical Company, pioneering work in the ceramic coating field was performed when portions of more than 500 complete exhaust systems for the Douglas A-20 attack bomber were given thick porcelain enamel coatings. These were applied on SAE 1020, a low carbon steel used in manifolds because of a critical shortage of stainless steel.

3000 horsepower engines

Today the use of these coatings has taken long strides as metallurgists, designers and service engineers continue their development studies. Stresses have gained in magnitude and operating temperatures of piston-engine exhaust systems have

increased considerably since World War II. Engines generating 3000 h.p. and more, nearly twice that of the biggest power plants in regular use in the last conflict, are not uncommon. The need for improving heat resistance and checking corrosion from the exhaust gases has increased sharply.

For several months, tests of "header" sections of Ryan exhaust systems with thin ceramic coatings of .001" to .003" have been conducted under regular service conditions in a Pan American World Airways' Boeing 377 Stratocruiser operating on trans-Pacific runs.

These tests have been the subject of innumerable conferences in Seat-



Complex exhaust system built by Ryan for Boeing 377 Stratocruiser is examined by the author and C. L. Foushee, Jr., service manager. A ceramic coating extends life of the equipment.



Above: Conveyor carries "header" sections to firing in special high-temperature V-bottom furnace, 12 feet long, 5 feet high and 4 feet high. Firing time is approximately 12 minutes. Right: Fired parts are thoroughly inspected for complete coverage.



tle and San Francisco between C. L. Foushee, Jr., Ryan service manager; T. C. Hacker, manifold project engineer; and Boeing and Pan-American technicians.

After 650 hours service, close examination was made in Ryan's engineering laboratory of the comparative effects of high temperature on headers ceramic coated inside and out, headers coated only on the inside, headers with no coating, and headers fabricated of other heat- and corrosion-resistant alloys.

1200 hour service tests

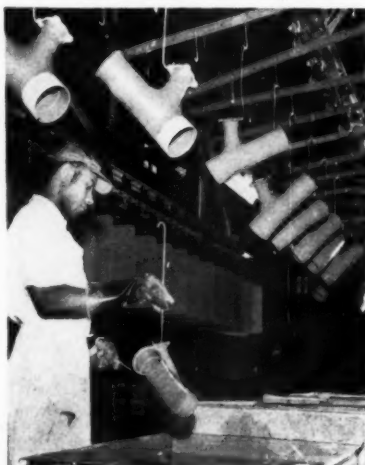
The results have been considered encouraging enough to merit production of "B" and "C" row cylinder header assemblies with ceramic coating for the Boeing 377's. Meanwhile, service tests are continuing, and inspection is underway on ceramic coated headers and non-coated headers which have been in use more than 1200 hours on the same plane.

The header with ceramic coating inside and outside, after 1234 hours, was revealed to be essentially the same as when examined at 650 hours.

It was determined by thickness, measurements and spectrographic analysis that the ceramic coating still is in evidence on both the inner and outer surfaces. This indicates that the ceramic has offered complete protection for that period of time.

Additional tests are being conducted on an American Airlines Convair 240, in which the entire exhaust sys-

Ceramic coating is applied by dipping for complete coverage of both interior and exterior surfaces.



tems of both engines have ceramic coatings, and on a Pan American World Airways Boeing 377, in which one engine has the collector ring, as well as the header assemblies, ceramic coated.

The problem of heat resistance is greatest in the headers, which comprise those portions of the manifold bolting directly to the cylinder heads of the engine. Gases are introduced first into the headers before they pass into the collector rings. Exhaust gas temperatures are most intense in the headers, cooling somewhat when they flow into the collector rings.

1900° F. temperatures

In today's powerful engines, temperature of gases in the headers is above 1900°F., compared with temperatures ranging from 1200° to 1600°F. in World War II. Greater horsepower and higher back pressures through the use of turbo-superchargers are among the factors responsible for producing temperatures exceeding the heat resistance of some of the most expensive alloys.

to Page 104 →

Which Grinding Ball IS Hand-Rolled?



ANSWER:

*The Ball that Grinds
Hardest and Lasts Longest*

MCDANEL

Hand-rolling gives an inner strength to a grinding ball which eliminates strains and laminations.

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McDanel Porcelain Grinding Balls will not crack or break up in the mill. They are high-fired, slow-cooled, mill-tested, individually inspected. McDanel Porcelain Grinding Balls grind faster and surer . . . and last longer. For production efficiency and economy always specify McDanel!

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Exclusive Representative for the Enameling Industry



Tom Butler, enamel superintendent at Strong, is about to strike a coated panel on a test ring to demonstrate resistance to impact.

A PROGRESS REPORT

FOR years the goal of porcelain enamellers has been the application of white cover coat direct to steel. Considerable effort has been expended toward achieving this goal, and in the last several years cover coat directly on the steel has been produced successfully, but special premium steel was required.

Our company has carried on an

intensive research and testing program to develop the means whereby cover coat could be applied directly to *non-premium steel. This aim is now an accomplished fact. We have developed a process for obtaining a one coat white titanium cover coat finish that may be applied direct to non-premium* steel without the need for ground coat.

The resulting finish passes all the tests to which standard vitreous enamel cover coat over ground is subjected. It has been proved in production since last spring on fluorescent reflectors which we manufacture for Westinghouse Electric Corporation, and it has been used satisfactorily on other products normally requiring ground coat and cover coat.

Standard enamels used — low firing favored

The new process makes possible the production of a completely satisfactory porcelain enamel finish at a thickness as low as three thousandths of an inch, thereby reducing damage from mechanical shock to a minimum. It is possible to apply success-

A new process for the co

presenting photographs of demonstration showing the

by Paul S. Cecil... GENERAL, THE S

fully all commercial-type titanium opacified enamels directly to the steel, but the softer, lower firing enamels have been more successful than the conventional temperature enamels. This indicates that lower firing temperatures will be in order in utilizing this process.

The present finish has good acid resistance, high reflectivity, resistance to thermal shock, excellent resistance to abrasion, and color stability after firing.

Some of the additional properties of this material can best be shown by photographs of demonstration tests.

Some additional details which may be of interest are the following:

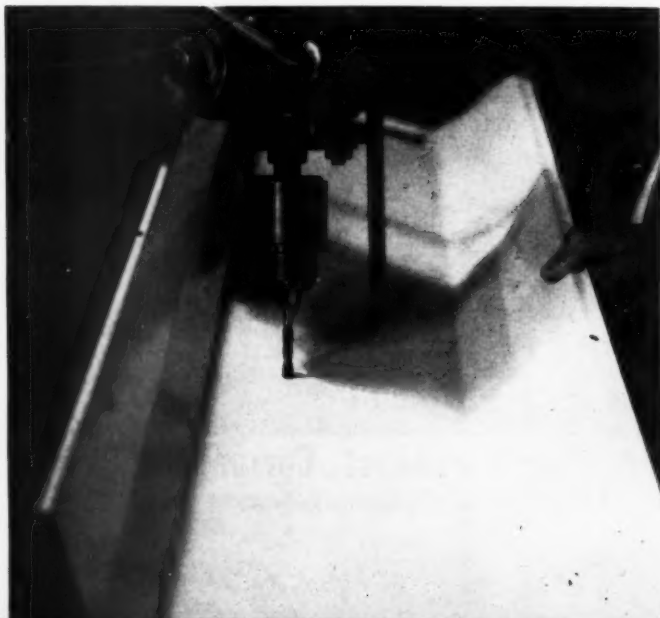
The steel used for the production of fluorescent lighting reflectors is standard enameling iron.

Over 200,000 square feet of production work has been run.

The finish works satisfactorily over welds, as in the case of box and reflectors with ends welded in.

Drawn shapes of 6" or more depth in a single draw cause difficulty at the present stage of development. This eliminates the hydrator pan and sim-

Drilling — In this photo it may be seen how a hole has been drilled through a coated fluorescent reflector.



Shearing — Showing result after a strip has been sheared from a sample piece. Note cleanly sheared edge.



Sawing — Showing result after a strip has been sawed from a sample piece. Note cleanly sawed edge.



the coat white direct to steel

showing the application of cover coat porcelain enamels direct to steel

CECIL, THE STRONG MANUFACTURING COMPANY SEBRING, OHIO

ilar drawn parts for the present, although tests show promise.

Pilot runs show good results on incandescent reflectors incorporating both seam welding and beading.

Although the regular production on fluorescent reflectors employs enameling iron, similar results are being achieved with cold rolled steel.

Gauges of steel normally used are from 22 to 20 gauge.

Successful test samples have been run on products using gauges as light as 30 and as heavy as 16 gauge.

Normal firing with present enamels is at 1550° F. for 3 minutes.

EDITORIAL COMMENT

In presenting brief comments by Mr. Cecil on this recently reported development, and the accompanying demonstration photographs, *finish* is continuing its series of "progress reports" relating to the application of cover coats direct to steel.

Details of the new process as developed by the Strong organization have not yet been made available for publication. It is significant to note that standard equipment and mate-

rials are employed. These include standard titanium frits as supplied by commercial producers and standard enameling iron (with similar results claimed for cold rolled steel).

It is indicated that advantages to the process will result with a decrease in firing temperatures for titanium-type frits.

Mr. Cecil and George Wood, factory manager at Strong Manufacturing, as well as others in the organization, are extremely enthusiastic over the possibilities which their development presents. Many who have seen a demonstration of the resulting ware have indicated strong interest in its possibilities.

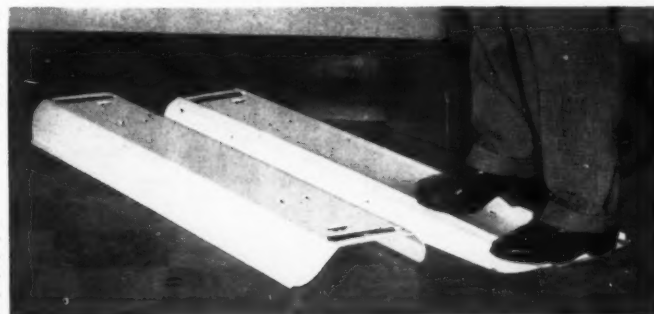
This severe test on a fluorescent reflector shows resistance to bending when compared with normal reflector shape.

**NOTE: When Mr. Cecil refers to non-premium steel he includes standard enameling iron in the "non-premium" category.*

Final appraisal of the practicability and economy of the process by the enameling industry must of necessity await release of processing details.

Strong plant executives have assured *finish* editors that after certain additional progressive steps have been completed it is the company's intention to develop a plan for industry participation in the use of the process.

As additional information is made available for publication on this or any similar development, *finish* will keep readers posted through a "PROGRESS REPORT."



Sawing—Paul Cecil, ceramic engineer at Strong, shows reflector that has just been completely sawed through.



Bending—Coated steel shown passing through rollers of a bending machine and being formed into a circle.



A symposium on conservation of pickle room materials

by J. J. Baker, M. H. Whitehead, and L. C. Farrow

INTRODUCTION

FOR the past several months there has been a shortage of practically all the materials involved in the pickling operation. Consequently it has been of prime importance to use these materials as sparingly as possible.

This symposium approaches the problem from a shortage of supply viewpoint rather than from the economics involved. Naturally any raw material savings has an economic value; however, approaching the problem from this viewpoint entirely is usually expensive in the long run, for in general pickle room chemicals are less expensive than any of the other materials used in the enameling operations.

Until approximately a year ago,

some of us had a regular time schedule as to when each individual tank was to be discarded, regardless of whether the solution was properly doing its particular job or not.

Since that time it has become imperative that this practice be stopped, if possible, to save material.

Some of us have undoubtedly been discarding perfectly good chemicals; others, on the other hand, have tried to stretch the life of the solutions to the extent that defects and troubles have been encountered on the enamel floor.

In some cases, where the solutions have become contaminated with foreign materials that act as buffers, they can be rejuvenated to the ex-

tent that they will continue to do a reasonably good job.

All of the solutions have a definite end point when they should be discarded and the tanks re-filled with fresh solutions. The life of these solutions depends on several obvious factors, and will vary from one plant to another.

For the most part the life expectancy of some of these solutions can be rather closely predicted by the past history, production records and control checks, provided, of course, that the variations in the steel and drawing compounds used are not too large, as they are in some job shops that do not have any control of fabrication.

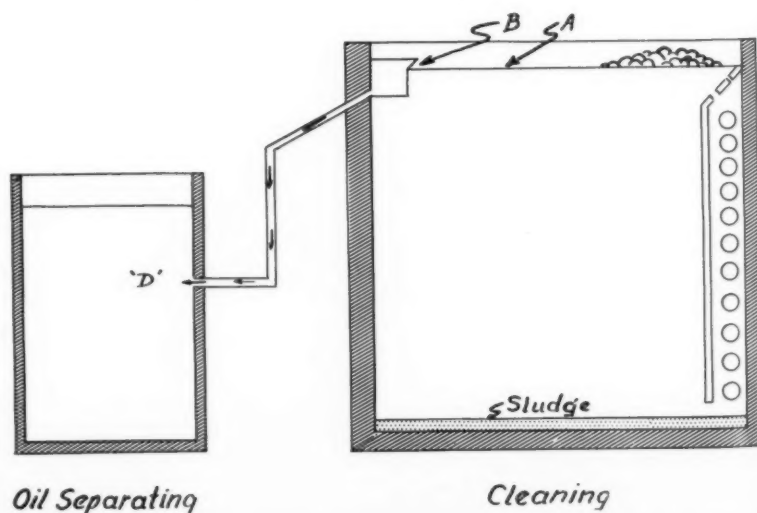
PART I—Conservation of cleaner

by J. J. BAKER, Porcelain Process and Control Supervisor,
International Harvester Company, Evansville, Indiana

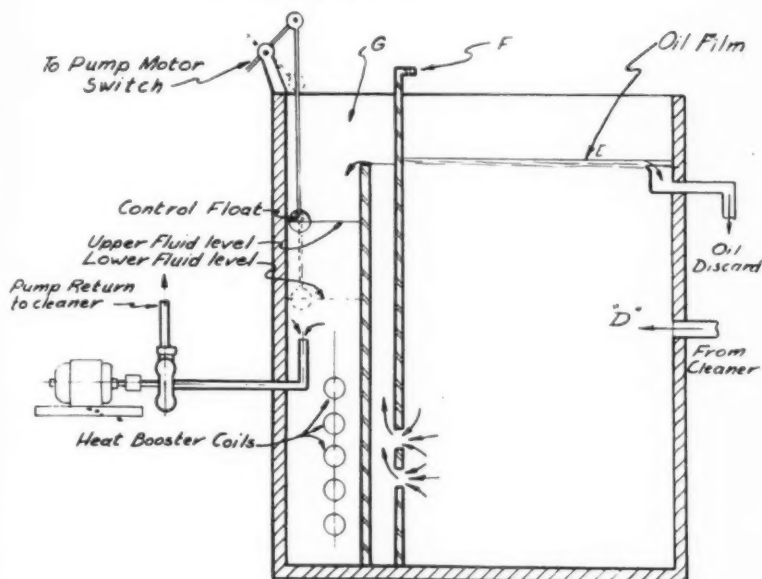
AS many *finish* readers are painfully aware, the supply of soaps and cleaners was critical in the last emergency and promises to be again. Our problem is to extract the utmost cleaning from every pound of cleaner before we discard it. Obviously, extending the life of the cleaner without impairing the quality of the cleaning would accomplish this.

Normally, the life of a cleaner terminates when the daily additions required to maintain its effectiveness become excessively high. There are two promising ways to postpone this point. One is to reduce the amount of any undesirable material on each square foot of metal to be cleaned. The other is to scavenge off the ex-

Stock Steel Cleaning Tank



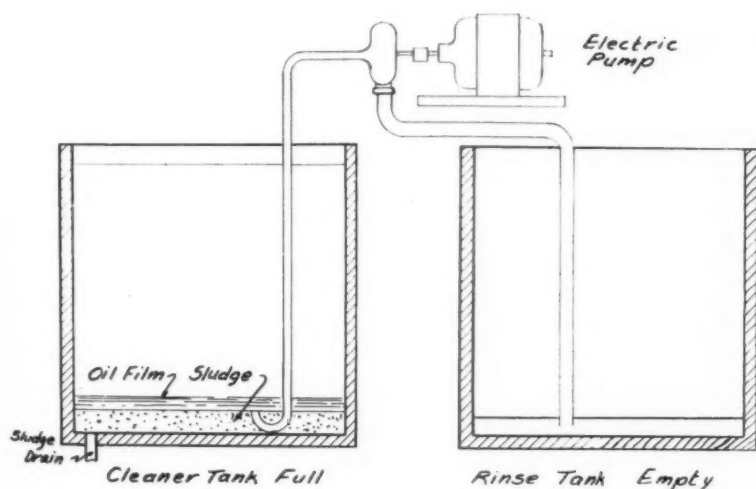
Detail Oil Separation Tank



The oil coming to the top (E) is held back of the baffle (F). The solution below the oil level and above the sediment level flows under the baffle (F) and over another baffle (G) into a separate section where a control float, connected to a centrifugal pump, samples from the center and returns the solution to the cleaner tank.

The separation and disposal of the heavy sludge forming on the bottom of the tank proved less troublesome than the oil and was satisfactorily removed periodically by inserting a Monel pipe with a hook on the end. (Monel is suggested in case this system is also used on the nickel tank.)

Cleaner Tank Sludge Removal



The cleaner level (A) stands just below the gutter level (B) when the pickle basket is not in the tank. The air jet continuously blows across the surface of the tank, causing any oil which rises to the surface to be blown toward the gutter. When the pickle basket is lowered into the tank, the cleaner overflows into the gutter and hence down into the separating tank (D) where the solution is allowed to settle.

hausted or harmful chemicals in the used cleaner. Both methods should be pursued vigorously as each provides independent benefits.

The amount and character of the material to be removed in the cleaning operation can be reduced and controlled in several stages of the previous metal forming operations. The first opportunity is the removal of the metal preservative applied by the steel manufacturer and in some instances the compound applied by the fabricator. Some of the advantages inherent in this system are:

1. It tends to keep mineral oils out of the enamel plant pickling system.
2. Removal of the metal preservative allows a uniformly thin coating of dry soap.
3. The economy of cleaning material is possible as a minimum of cleaner is required.

Operations are set up before the fabrication process on the basis of:

1. Cleaner Tank
2. Cleaner Rinse
3. Dry Soap Tank
4. Tank Drier for Sheets.

This system is in operation in several enamel shops and has functioned well enough except that cleaner life was very short. Inexpensive and high priced cleaners failed to clean after a short time. After short periods of operations, the stock sheets showed water breaks on coming out of the cleaner. Titration tests at this time showed active Na_2O content, after additions, as high as at the time of initial change.

We were convinced that some other force was preventing the cleaner from functioning, inasmuch as the oil was being redeposited on the sheet upon emerging from the cleaner bath. Observation of an oil film on the top of the cleaner gave evidence to this supposition.

Rejuvenating the cleaner

Tentative proof was established by siphoning off the middle solution in the tank and discarding the sediment-laden bottom four inches of solution and the top oil film. That is, the oil film on the top and the heavy sediment on the bottom of the tank were removed from the cleaner.

The cleaner then was adjusted to strength and temperature and was put into operation. This cleaner functioned in a completely satisfactory manner. The rejuvenated cleaner was kept in operation and worked successfully for nearly as long as the fresh cleaner had.

A second rejuvenation restored the cleaner a second time. The cleaner appeared capable of indefinite restoration. There gradually evolved a continuous method of removing the oil from the top and an intermittent method of removing the less trouble-

some sludge from the bottom. We do not have a finished plan as we are still making minor changes as we go along.

A modification of the set-up illustrated has operated successfully and to date has prolonged the life of the cleaner tank by at least five times.

Through the use of the system all but the bottom four inches was pumped into a stand-by tank. The bottom sludge-laden four inches was dumped down the sewer.

The construction of the hook is essential to the proper function of

the operation. When insterted in the cleaner tank, the sludge on the bottom was not disturbed even when the fluid level dropped to within an inch or two of the pipe opening. This was not the case when pipes were inserted with the opening down. With a down opening pipe the sludge tends to be gathered in, even when the pipe is several inches above the sludge.

We are far from finished with the work, but we feel we have located one of the culprits which dealt an early death to many a cleaner.

PART II—Conservation of sulphuric acid and nickel sulphate

by M. H. WHITEHEAD, Ceramic Engineer, Canton Stamping & Enameling Company, Canton, Ohio

THIS discussion will touch briefly on the storage, handling, use and possible reclaiming methods to obtain maximum benefit from the available supply of sulphuric acid and nickel salts for the treatment of sheet steel prior to porcelain enameling.

When sulphuric acid is purchased in bulk, i.e. tank cars or tank trucks, it is well to establish a program of routine inspections of storage tank, transfer pipe, and all valves and fittings to insure against loss of acid due to failure of these items. Installation of a safety shut-off in the discharge opening of the storage tank will permit a quick stoppage of flow in any emergency in the transfer system. Such a shut-off may consist of a tapered lead plug suspended immediately above the opening by means of a quick-release device through the top of the tank, so that a flip of the catch will drop the plug and seal the opening.

It is believed that ordinary black iron pipe is suitable for all the transfer pipe except the last length preceding the service discharge valve. This last length of pipe should be brass so that adequate flushing with water can be accomplished without damage to the pipe. (Dilute acid will attack the iron readily, whereas the concentrated product will not.)

A vessel of earthenware or iron should be placed under the service outlet to catch any spillage or drip

when acid is being measured for addition to the pickling tanks. Any acid thus saved may be included in the regular addition at any time.

Process and operational control are primary factors

In the use of sulphuric acid pickling tanks, the primary factors of conservation are involved with process and operational control. Aside from any problems or defects resulting therefrom, overpickling is wasteful of acid and should be avoided by establishing and maintaining rigid control of strength, temperature and time of immersion. The effects of each of these factors on the rate of attack on the steel surface are well known. Overpickling is costly in that acid is expended, and FeSO_4 is gradually built up to the point that pickling is retarded and the tank must be discarded.

Scumming of tanks results mainly from poor cleaning and/or poor rinsing, and may eventually cause the tank to be discarded if not properly dealt with. Careful attention to cleaning and rinsing is the first step to be considered, and careful removal of scums formed follows. Periodic dipping of scums during operation is helpful, and painstaking cleaning of the surface and sidewalls of cooled tanks during shutdowns will increase tank life. A blast of cold air across the tank prior to scum removal dur-

ing shutdown will facilitate the collection of the scum in a limited area of the solution surface.

If acid is purchased in carboys most of the foregoing remarks are applicable, and all that need be said further is that suitable safe storage space and proper tilting devices should be provided.

Of more concern than acid to most of us are the highly critical nickel salts. These strategic materials are not only in short supply, but very expensive as well, so it behooves us to treat tenderly each crystal we receive. This is true in some branches of the industry to an even greater extent.

Storage of nickel salts, whether in paper bags, wood barrels, or paper cartons, should most certainly be as dry as possible. All containers should be placed on pallets, off the floor, out of danger from damage by passing traffic of all sorts encountered in the factory. Proper provision for "first in, first out" consumption will help avoid loss due to breakage of containers which are subject to deterioration. Good housekeeping (a fine policy anywhere) to the extent of keeping the weighing area sufficiently clean to permit any spillage to be swept up and used will aid in stretching dwindling stocks.

Nickel deposit—the key to control

Remembering that each phase of

to Page 45 →

→ from Page 40

processing is affected by one or more of the preceding phases, in using a nickel tank we will obtain the greatest benefit from our limited nickel supply if we consider the amount of nickel deposited on the steel surface as the key element in our process control. It is well known that such factors as time of immersion, bath temperature, strength, pH, amount of buffering substance and condition of steel surface all have their effects on the amount of nickel deposited. It is necessary then to determine in each plant the exact amount of nickel required to give the desired results under the existing conditions, e.g., steel

in process, firing procedure, enamels in use, etc., and to limit the application of nickel to this amount by controlling all the phases in the surface preparation process. Constant checks on weight of application are of prime importance in the conservation of nickel. The usual precautions against excessive carry-out, extraneous contaminants, and dilution and pH disturbance by carry-in must be observed.

Any one of several methods may be used to avoid dumping nickel tanks because of the presence of iron sludge. Operating with low pH (3.0 to 4.0) will retard the formation of such sludge. Commercial filters for

continuous or periodic filtering of the bath are available. The solution may be brought to pH 7.0-7.2 by the addition of caustic, aerated, cooled, and reclaimed after the iron sludge has settled. It is then made ready for use by bringing to strength and adjusting the pH with sulphuric acid.

Reclaiming of nickel salts from baths rendered unfit for further use may be resorted to as a possible source of nickel if the element of cost is of no moment. Iron and nickel are precipitated together, collected as filter cake and processed in the using plant or returned to the manufacturing supplier for separation.

PART III—Conservation of sodium cyanide neutralizers

by LEWIS C. FARROW, Ceramic Engineer, Clyde Porcelain Steel Corporation, Clyde, Ohio

SODIUM cyanide is one of those materials that have been rather difficult to obtain, and in our case at least it is an essential material.

We have two different types of pickle line. One is the old conventional type where the ware is loaded into baskets and conveyed from one tank to another by means of an overhead traveling hoist. The second is the automatic immersion type. Both lines have filters on the first neutralizing tank.

In the old line we have been able to use practically any type of neutralizer with satisfactory results. In the automatic machine, to date, we have only been able to use sodium cyanide in combination with caustic soda, followed by a very weak solution of caustic soda or borax. Combinations of soda ash-borax or caustic soda will not do a satisfactory job.

Extended transfer time requires sodium cyanide

By a satisfactory job, we mean pickled ware that is free of rust. Because of the transfer time from one tank to another a rather heavy coating of iron salts is formed on the ware which soda ash, borax, or caustic soda alone will not remove.

We tried operating without sodium cyanide. It necessitated the hand washing or wiping of every piece of

ware that came off the automatic pickle line before ground coating. The ware had a very heavy coating of iron salts, that even after hand wiping caused an epidemic of copper-heading.

When using sodium cyanide by itself we have found that the additions to the tank are excessive to maintain the strength of the solution at or above that point where the removal of the iron salts is made possible. As a matter of record we have found that in our case the sodium cyanide concentration must be held at a minimum of 0.25 oz. per gallon.

Use cyanide and caustic soda together

With the addition of a relatively small amount of caustic soda, the required additions of sodium cyanide are considerably reduced. In our case again, we have found that there is a savings of approximately 50% of sodium cyanide when used in conjunction with caustic soda over that when sodium cyanide is used by itself. In changing a tank with a fresh solution we add a sufficient amount of sodium cyanide to bring the concentration to 0.3 oz. per gallon, and caustic soda is added to obtain 0.3 Na₂O.

The addition of caustic soda apparently relieves the sodium cyanide

of some of its work by forming an insoluble iron hydroxide, which is removed by the filter. Also, the caustic soda maintains the alkalinity of the tank to the extent that the sodium cyanide is not broken down as readily by the carry-over of acid from the nickel rinse, forming hydrocyanic acid.

One of the most effective methods of conserving cyanide is by holding the amount of iron salts forming on the ware to a minimum. This may be done in two ways. First, because of the somewhat elevated temperature of the nickel solution, and the tendency of the ware to dry as it is being transferred from the nickel to the nickel rinse tank, it is imperative that the ventilation at this point is such as to prevent the atmosphere from becoming one of high humidity and acidic in character. The ware should also be kept moist at this point, which may be accomplished by means of a mist spray through which the ware can pass.

Secondly, by keeping the nickel rinse tank at an acid concentration of 1/4% the formation of iron salts forming on the ware is reduced.

There is undoubtedly a definite life span for the cyanide solution. To date we have been unable to determine just what that period is. A

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Metal stampers meet in Chicago

program for PMI annual meeting includes election of officers, views of "team" which toured Britain, safety suggestions, and a report on the steel outlook

THE annual meeting of the Pressed Metal Institute was held in Chicago at the Drake Hotel, October 3, 4 and 5. A well-planned program was on tap for metal stampers attending the convention, including election of officers, a discussion and exhibit on "Tools for Safety", a report of the American ECA Stamping Team which toured British stamping plants during the past summer, and a report on the Washington scene. A special program was planned for the ladies.

New officers elected

Following registration and committee meetings on Wednesday, October 3, the convention got down to business Thursday morning with the election of the following officers:

Thomas L. Baker, National Stamping Company, Detroit, was elected president of the Institute for the coming year.

Owen H. Wenning, of Worcester Pressed Steel Company, Worcester, Mass., was elected vice president.

Hunter Morrison, of Morrison Products, Inc., Cleveland, was re-elected secretary-treasurer of PMI.

In the Managing Director's Report, Orrin B. Wertz presented an interesting outline of trade association activities.

At the Thursday luncheon, presided over by C. C. Caditz, of North-



THOMAS BAKER, PMI PRESIDENT

ern Metal Products Company, and chairman of the PMI Chicago District, the stampers listened to a talk by Tom Campbell, editor of *Iron Age*.

Advantages of small plants

In his talk on "Steel Today and Tomorrow", Campbell stated that "Despite dire predictions about the precarious position of small business, experience shows that the small concern is far more rugged than is generally known. Small plants employing 500 or less persons have many advantages not enjoyed by some of their larger counterparts.

"Repeated forecasts about the elim-

ination of some small plants in major industries have just not turned out that way. This has been especially true with respect to small steel plants and small fabricating shops.

"This does not mean that small business hasn't got a tough row to hoe in the years to come. But with wide-awake management, company exploitation of its advantages and use of new management tools gives the small firm much better than an even break.

"Major advantages of the smaller plant over big business are: (1) complete flexibility in changing product or policies, (2) close personal relationship with employees, customers and community, and (3) ability to concentrate on specialties in addition to ordinary or standard products," stated Campbell.

Thursday afternoon was devoted to "Tools for Safety", with Walter T. Baird, of Toledo Pressed Steel Company, and Toledo District chairman, presiding. Included was an exhibit of safety devices and their application in stamping plants; a report by the Safety Committee on "New Safety Program for PMI."

Annual banquet

The annual banquet was held Thursday evening, with Owen H.

Photo taken during meeting of the new board of directors of the Pressed Metal Institute.



Shown are some of the members of the stamping team which toured Britain. Left to right: J. Walter Gulliksen, Carl E. Johnson, Ray Peterson, James Leake, and Thomas Baker.



finishfoto

Wenning acting as toastmaster.

Guest speaker for the evening was Bennett S. Chapple, Jr., assistant executive vice president, United States Steel Company. His address was entitled "Change Brings Progress."

Military expenditure figures

"Last January, this country embarked on a program designed to rearm the United States along with a large portion of the free nations of the world, all this to be accomplished hopefully without impairing, and in fact improving, our civilian standard of living," stated Chapple at the opening of his address. "In other words, to have butter and bombers, new clothes, and new cannon, all at the same time. This is a challenge unique in history. . . .

"Of more immediate interest to metal fabricators and steel producers is the fact that American industry has never been given a bigger or tougher assignment.

"Our government is now making actual military expenditures—as opposed to appropriations—at the annual rate of about 35 billion dollars. In the next two years, expenditures will rise to a 65 billion dollar rate and thereafter—if there is no full-scale war—will taper off. In 1953, according to plan, we will have a completely equipped army, reserve equipment to fight an all-out war for at least a full year, and the means to carry on using the product of then existing production lines. . . .

"Until now, we have been merely warming up to our task . . . The first quarter of 1952 will see the program in high gear and at full speed.

Weekly steel ingot production exceeding 2,000,000 tons

"In the months to come, the program will require a larger volume of basic raw materials, a greater percentage of existing industrial capacity, and more of the available indus-

trial manpower. Direct military needs will grow.

"All this adds up to an extraordinary demand for steel," stated Chapple. "In face of such demand, the distribution of steel has become a major national problem. There have been 39 weeks in this year to date, and each of 29 of those weeks scheduled steel ingot production has exceeded 2,000,000 tons. This is an almost incredible record; but in spite of it, the shortage of steel for certain uses continues acute. . . .

"There is no fundamental disagreement, of course, with regard to the fulfillment of needs for steel for military use and for directly supporting purposes. It is conceded that under current conditions such distribution must be directed by the government, not only to insure adherence to specific delivery schedules, but also to assure an equitable distribution of the defense load among producers of

to Page 68 →

Photo taken at annual banquet of the Pressed Metal Institute, held at the Drake Hotel, Chicago, October 4.



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1951 NATIONAL MEETING
DRAKE HOTEL CHICAGO

We've learned about Strippers from you . . .

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1. types of paint, 2. number of coats, 3. basis metal and/or surface treatment, 4. air or force dry . . . With all of these variables involved, there is, of course, no one Stripper that can take care of any and all jobs. That is why we have learned, in most cases, that it requires a laboratory examination of your paint to determine which product (compound) applies before a satisfactory operation of Stripping can be set up. . . . Write for complete information regarding this or any other metal cleaning problem. . . .



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13th annual PEI shop practices forum

ANOTHER PEI Shop Practices Forum, held October 10, 11 and 12, is now history and it can be described as one of the most successful Forums yet held from the standpoint of both attendance and program quality.

The attendance of plant men (not including students), was reported as the greatest for any Forum to date. The program committee, under the chairmanship of R. L. Fellows, presented a series of programs, symposiums and panels that showed important consideration of the "practical" aspects of porcelain enameling as well as attention to the current conditions under which the industry's plants must be operated.

Scene of the meeting was the campus of the Ohio State University, where the enamellers were welcomed by C. E. MacQuigg, Dean, College of Engineering, OSU, and by Prof. R. M. King of the University's Ceramic Department. Edward Mackasek, managing director of PEI, responded for the Forum visitors.

Session chairmen for the three-day meeting included: Prof. R. M. King,

OSU; B. J. Sweo, Ferro Corporation; Edward Mackasek, PEI; Prof. A. I. Andrews, U. of I.; and R. L. Fellows, Chicago Vitreous Enamel.

Conservation is highlighted

The first day's program gave attention to the possibilities for Conservation of Materials and Equipment under current operating conditions.

A *Symposium on Savings* applied to metal preparation was developed by L. C. Farrow (leader), Clyde Porcelain Steel Corporation; J. J. Baker, International Harvester Company; M. H. Whitehead, The Canton Stamping & Enameling Company (see complete report, Page 38).

Practical operation suggestions for *Conservation in Enameling Operations* and information on Reclaiming Defective Ware were presented by Evan Oliver, Servel, Inc., and A. M. Lander, New Process D-Enameling Corp.

Included in Oliver's paper were methods for on-the-line repairs to parts with repairable defects. Lander showed the possibilities for reclaim-

ing complete fabricated parts after rejection.

The *Outlook for Critical Materials* was presented by a panel of three men, with Dana Chase, *finish* Editor, as panel leader.

C. J. Harbert, The Harshaw Chemical Company, covered *Chemicals* required for all enameling operations except frit manufacture. Dr. G. H. Spencer-Strong, Pemco Corporation, explained the present situation with regard to *Frits* and frit chemicals. John T. Anderson, of Armco, presented the *Steel* picture.

In general, a summary of the comments would fail to show any immediate cause for alarm in the enameling industry. Conservation, substitution and reclamation are words which will continue to have extra significance during the coming months.

Symposium on test methods

Test methods for porcelain enamel finishes and products were included in four papers.

Thermal Shock Tests were discussed in a paper by M. A. Tuttle, North Carolina State University, and

Section of Deshler-Wallick Ionian room showing speakers' table at PEI banquet.



E. H. Shands, Roper Corporation. These men recommended that Commercial Standard CS 100-47, as used by the Enameled Utensil Manufacturers Council, be adopted, and that research be conducted to develop a test more applicable to all types of ware.

An excellent summary of *Methods for Testing Enamel Coating Discontinuities* was presented by Stanley C. Orr, The Pfaunder Company. *finish* considers this work of sufficient importance to readers that a resume will be withheld pending publication of the complete paper in a later issue.

George Warren, PEI Fellow at the National Bureau of Standards, presented an illustrated explanation of *Standardization of Test for Torsion*, and Grant E. Miller, Ferro Corporation, concluded the test symposium with a description of *New Developments in Tests for Fishscaling*.

Mobilization for defense

The Thursday afternoon session was devoted entirely to problems related to defense mobilization.

Dr. C. L. Shartle, OSU, discussed *Executive Leadership*, methods for measuring leadership in individuals and its importance in plant operation. He discussed a formula and questionnaire plan for measuring leadership qualities.

Government Specifications for Enamels were detailed by W. N. Harrison, National Bureau of Standards. (A list of specifications and an outline of sources is available through the Porcelain Enamel Institute.)

Conversion of Enameling Equipment was the subject of a paper by E. E. Howe, Chicago Vitreous Enamel. He outlined possible conversion uses for pickle room equipment, sand blast equipment, spray equipment, enameling furnaces, and plant personnel.

The difficulty of conversion for enameling plants under conditions of "semi-conversion" as compared to complete change-over were pointed out.

New product development and application methods

An excellent paper on *Corrosion* to Page 107 →.



FORUM





the Finish candid camera



PHOTOS

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Big game hunting

REPORT OF A SPEECH *by R. A. Dadisman* • MANAGER, MARKET DEVELOPMENT DIVISION, ARMC STEEL CORPORATION; PRESIDENT, PORCELAIN ENAMEL INSTITUTE

IN pointing to the future Mr. Dadisman painted a picture that should whet the appetite of any manufacturer of metal products. In his opening remarks he said:

"Big game hunting in American business is rough going today with artificial market conditions like vast jungles of confusion that distort our sense of direction. And there are deep gulleys made almost impassable by government restrictions and shortages of vital materials.

"But there's really big game to be found in those hills and valleys, so I want to go over the prospects with you and outline plans for an expedition that will extend over the next twenty years.

"Let's adjust our thinking to big game . . . Pay no attention to the small game that pops up as you think of your individual problems. When the time comes to skin and dress the carcass, there will be enough choice cuts for everyone. . . .

"Markets, of course, are based on such fundamentals as population growth, national income and consumer expenditures. And here is the real basis for confidence in the outcome of the expedition. . . .

"In order to translate broad estimates of growth potential into terms of individual product volume we have, in most cases, projected the relationships that existed in past years between production and national income. Our findings are shown in Table II. . . .

"If you want more evidence of the possibilities for bagging really big game in the years ahead, consider these facts.

"Almost 7 million homes have no bath tub or shower.

"6 million housing units have no private toilet facilities.

"3 million have no running water.

Table 1

Projected U.S. Population, National Income and Consumer Expenditures

	1940	1950	1960	1970
Population	132 million	151 million	170 million	190 million
National income	\$81 billion	\$239 billion	\$310 billion (1950 \$'s)	\$410 billion (1950 \$'s)
Consumer durable expenditures	\$8 billion	\$29 billion	\$38 billion (1950 \$'s)	\$49 billion (1950 \$'s)

"Over 8 million have no water-heating facilities.

"2.5 million homes are in need of major repairs.

"18 to 22 million new homes will be built in the next 20 years."

In discussing the "pay-off" from his estimates of expanded markets in terms of porcelain enamel production the PEI president continued:

"To get a basis for future prospects we have studied various records, and estimates of the past, related them to national income and projected the relationship 20 years into the future. Here is what we found.

1920 —	30,000,000 sq. ft.
1930 —	125,000,000 sq. ft.
1940 —	225,000,000 sq. ft.
1949 —	400,000,000 sq. ft.
1960 —	700,000,000 sq. ft.
1970 —	900,000,000 sq. ft."

Open hunting

According to the speaker, "The estimates for 1960 and 1970 are

based on the assumption that the growth relationship between porcelain enamel and the nation's economy in the past will be maintained in the future.

"This means a growth from 1949 in the use of porcelain enamel of 75% by 1960 and 125% by 1970", he stated, "if we just hold our own. But, of course, the whole purpose of this hunting trip is to improve our position.

"Think of the added volume if all exteriors of major appliances were produced in porcelain enamel in 1970. Refrigerators would add 274 million square feet, home freezers 158 million, dishwashers 35 million, laundry dryers 115 million, and washing machines 133 million.

"But holding our own will be a tough job, and improving our position will be even tougher.

"In fairness to all of you, I should point out that the porcelain enameling industry will not be the only hunt-

Table 2

Projected Unit Sales for Major Home Durables

	1940	1949*	1960	1970
Electric refrigerators	2,700,000	4,450,000	6,500,000	7,000,000
Ranges (gas and electric) ..	2,192,000	3,126,000	5,500,000	7,500,000
Washing machines	1,552,600	3,200,000	5,500,000	7,500,000
Room air conditioners	6,000	95,500	1,500,000	3,000,000
Home freezers	5,000	485,000	2,000,000	3,000,000
	(est.)	160,000		3,500,000
Dishwashers	5,000	105,700	2,000,000	4,000,000
Laundry dryers	(est.)		2,500,000	5,300,000
Steel plumbing fixtures	400,000	1,415,000	3,000,000	

*Due to abnormality of 1950, used 1949 as comparison year.

ing party in the field. Already we know that plastics, organic finishes, glass, stainless steel and aluminum industries are equipping parties to invade the same hunting grounds. They are good marksmen and will be well equipped."

As an investment in successful "hunting" and future progress, Mr. Dadisman called for continued Product Improvement (by practical and technical men in plants and laboratories), Improved Quality Standards

(by the PEI), and Better Selling (by everyone concerned).

To strengthen market development

Mr. Dadisman outlined plans for "market broadening" activity. The PEI presently is embarking on two major projects.

One is the Curtain Wall Development Project to furnish the construction industry with a light-weight, thin curtain wall in multi-story buildings. A fund of \$50,000 has been established for research and development.

The other major project is a plan for development of New Uses. (A list of 101 has been developed.) It was stated that "A member of the Washington staff (Edw. Mackasek) will devote the major part of his time in working with porcelain enamellers and with prospective users in an effort to get these and other new uses started."

In conclusion, Mr. Dadisman outlined the requirements for successful hunting during the next 20 years:

- "1. Improved product—base metal, frit and enameling processing.
- "2. Better packaging and better handling by shippers and carriers.
- "3. Better selling—in all aspects.
- "4. More use of porcelain enamel in present and new products."

Editor's Note: 1950 Sales

In his tabulation of appliance sales, Mr. Dadisman used 1949 figures for the latest "current" reference. It is interesting to compare these figures with 1950 sales for the same products.

Electric refrigerators	6,200,000
Ranges (cooking)	6,134,729
Washing machines	4,345,000
Room air conditioners	3,260,000
Home freezers	890,000
Dishwashers	230,000
Laundry dryers	295,000

AES abstract authors

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NEW LITHIUM SOURCE

American Potash & Chemical Corporation expects to commence production of technical grade lithium carbonate by January, 1952.

In making the announcement to finish, Robert M. Curtis said, "As this material has been in very short supply for enamel manufacture, our production (500 to 600 tons yearly) should go a long way to relieve the shortage."

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Makers of the famous "Minute-Minders" • WATERBURY, CONN.
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Comprehensive abstracts of AES papers

continued from the October issue of *finish*

THE following are more selected abstracts of technical papers presented before the annual convention

of the American Electroplaters' Society. (The October issue of *finish* contained 12 abstracts.) A listing of

authors and the company connections may be found on the opposite page.

Evaluation of quality of electrodeposited coatings

by CARL DURBIN

Quality is defined as the ability of an electrodeposited coating to give satisfactory performance in service. Evaluation of quality may relate to the suitability of a coating for a given use, or it may be employed in production control.

The safest method for the evaluation of a coating for a given use is a life test in service, but at the same time certain properties of the deposit that can be determined in a short time should be measured for use in production control. These laboratory measurements must be correlated with service tests.

The properties to be measured and the tests to be used to evaluate them depend largely upon the plated metal,

the basis metal, and the intended use of the coating. Initial appearance, appearance after reasonable service, adhesion, thickness, internal stress, ductility, porosity, and hardness are some of the properties which can be determined directly or indirectly, and correlated with service life. The effects of thickness and adhesion are well known, but the relationships between internal stress and ductility and service life need a great deal of study. There is little doubt, however, that in at least some cases a combination of high stress and low ductility is detrimental. The controversial salt-spray test is of some assistance in the evaluation of coatings, but must be used with great care.

Of the properties that are commonly measured, thickness and hardness can be determined with good objectivity. Adhesion, stress, ductility, and porosity are more difficult to evaluate, and are usually measured on special test specimens rather than on the work itself. In most cases more than one test method for a given property is available, and a careful selection must be made according to the requirements of the coating and the basis metal.

A knowledge of the finishing cycle greatly facilitates estimation of the quality of deposits, especially when variables in the plating cycle have been correlated with service.

Chromate treatments

by CHARLES W. OSTRANDER

Chromate treatments are employed to prevent the formation of voluminous white corrosion products on zinc and cadmium surfaces, and to polish or color these metals.

Chromate conversion coatings on zinc, cadmium and in some cases aluminum surfaces are produced in three basic types of chromate solutions operated at pH's below 7. Within each type there are variations in procedure or conditions of operation which will lead to films having specific colors, corrosion resistance or other properties.

The simple dip solutions for chemical polishing are operated at pH

values of 0.0-1.5, and in 5-60 sec yield lustrous coatings of medium corrosion resistance on zinc and cadmium which range in color from clear to light iridescent yellow.

Single-dip non-polishing solutions operated at pH 1.0-3.5 will produce in from 5 sec to 5 min medium-to-heavy films ranging in color from iridescent yellow to bronze, olive-drab and black. Such films provide maximum corrosion protection, and, with the exception of black films, can be dyed red, green, blue or black with certain alizarine and diazo dyes. This general type of solution and procedure is applicable to aluminum,

its alloys, and to zinc and cadmium.

The solutions which require anodic treatment of the work will produce yellow-to-black films on zinc at current densities of 5-50 asf at pH values of 2.5-6.0 in 3-5 min. They find use in the aircraft industry for the production of black films and in the refrigeration industry for clear films.

All of the solutions are operated at low temperatures ranging from 60 to 100° F., and the equipment required is very simple. Although the solutions may be compounded by the user, there is an increasing tendency to employ proprietary mixtures for ease and reliability of operation.

Organic coatings in today's metal finishing

by DONALD R. MESERVE

Clear lacquers or synthetics are often used in normal times to supplement metallic finishes, but when shortages of metals for plating occur,

these organic coatings can be used in other ways to make bright metal finishes possible in spite of governmental restrictions on the use of

critical metals such as copper, nickel and brass.

Bright chromium plate without an undercoating of nickel would not be

a practical finish for most conditions of exposure were it not for the fact that special clear baking synthetics having the necessary hardness, clarity, gloss, adhesion, abrasion resistance, and resistance to humidity and salt atmosphere have been developed to protect and supplement the chromium. Long experience in the formulation of clear coatings for normal use in the hardware, sporting-goods and other industries has provided a sound background from which technologists have been able to progress rapidly in the development of organic coatings that have the desirable prop-

erties for new uses. Acrylic alkyd-urea-formaldehyde, and melamine-formaldehyde-alkyd resin combinations have been found to be the most suitable for metal-finishing purposes. Most specifications written for these materials are more stringent than those for the usual copper-nickel-chromium finishes. Dry-film thicknesses range from 0.0005 to 0.002 inch, and the films are baked for 20-30 min at 250° F. or as little as 7-10 min at 400° F. Excellent adhesion is possible when proper surface preparation is employed.

A chromium-like appearance can

be attained with bright zinc which has been clear-dipped and protected with clear synthetics. The extensive use of this finish in the *refrigeration* industry has not only proved its value, but has also provided extensive experience in the detection and remedy of troubles encountered.

Tinted clear coatings may be used to simulate gold, copper and brass, and can be applied to chromium, zinc, stainless steel and aluminum. Opaque, pigmented coatings are, on the whole, unsatisfactory as substitutes for metallic deposits, and consumer resistance to them is high.

How the plating industry will benefit from research on metal cleaning

by E. T. CANDEE

Research activities may be classified as either applied or basic research, depending on whether the objective is the development of a product or a production process or the accumulation of thoroughly verified facts which may or may not have immediate practical application. Inasmuch as basic research cannot be pursued effectively in most industrial laboratories and inasmuch as the facts and data obtained from basic research are necessary for progress in industry, the AES research program has been directed entirely toward basic research. The process of selecting a specific problem can be well illustrated by reference to Project 12, "Cleaning and Preparation of Metals for Electroplating".

The committee might have selected a problem on the effect of alkalinity in cleaners, the stability of wetting agents, rate of saponification, residual films from cleaners, or any of numerous other problems of immediate practical interest. All of these, however, are difficult to divorce from proprietary and competitive formulations. They are also, in many cases, difficult to study in the laboratory away from the production line.

Attention was turned to the study of testing methods for evaluating the cleanliness of a metallic surface. The results of such an investigation will benefit the producers of basic chemicals, the manufacturers of proprietary cleaners and the users of cleaners, rather than a small group that

might benefit from the solution of a specific practical production problem.

If the test for evaluation of cleanliness is to be of value to all who may want to use it, it must meet many requirements, and all pertinent facts concerning it must be investigated. The committee has listed ten cogent questions which must be answered in the course of the research, and the answers to these questions will determine the value of the atomizer test which is now under investigation or any other test which may be proposed. Any test which, by basic research, meets the criteria of usefulness will become a powerful tool for all workers in the field of metal finishing.

Highlights of the American Electroplaters' Society research program

by DONALD PRICE

Research in general may lead to new products, improved methods and processes, or basic scientific information. Inasmuch as the American Electroplaters' Society is not concerned, as a group, with the development of new products, its research program is concerned with devising better methods of testing and control or with the gathering of fundamental information which will be of assistance in solving a wide variety of practical problems.

Seven of the active projects of the AES research program may be divided into two groups, one having to do with the properties of electrodeposits and the other with the effect of various operating conditions on electrodeposited coatings. The eighth project is concerned with the disposal of plating-room wastes.

In the group of projects on the

properties of deposits, Project No. 9 has accumulated a vast amount of data on the physical properties of nickel deposits prepared under a variety of conditions in 19 bath compositions. The work of Project No. 6 on the porosity of electrodeposits has progressed from studies of gas permeability to the development of a technique for following the rates of corrosion by analysis of the corrosion products. Project No. 13 will attempt to determine the practical significance of the work of Project No. 6 by establishing, if possible, a correlation between gas permeability of deposits and their behavior in accelerated and outdoor exposure tests.

Projects Nos. 2 and 5 both are concerned with impurities in plating solutions, the first with their determination and the second with their effects. Project No. 5 also deals with

the effects of purification of the solution on the properties of the deposits. Project No. 2 has done much valuable work on the analysis of plating solutions for small amounts of harmful impurities. Project No. 11 has as its objective the development of simple methods to predict the optimum arrangement of work in a plating tank to secure uniform metal distribution on irregularly shaped objects. Project No. 12 is currently concerned with the study of a new test for evaluating cleaning processes.

Data for the scientific solution of waste disposal problems in the plating room have not been available in the past, and it is the objective of Project No. 10 to obtain such data. With this information, engineers will be able to solve specific problems systematically, rather than by trial and error.

Rotospraying...

at MAYTAG



Yes . . . Rotospraying is the accepted method of sieving enamel slip at The Maytag Company. Rotospraying assists in the proper cleaning of milled enamel to insure against contamination, and to help in the production of the Maytag automatic washer.

And throughout the enameling industry hundreds of Rotosprays are on guard for the proper cleaning of milled enamel and to help in the production of the finest quality enamel finishes for washing machines, ranges, refrigerators, sinks, bathtubs—in fact for all types of enameled products.

Check your plant today and make sure that you have the correct number and correct size of Rotospray units to properly prepare your enamel slip at lowest possible cost. Then check with us or with any authorized representative.

← Photo shows Rotospray in operation in The Maytag Company's Plant 2, in Newton, Iowa.

Contact us direct or one of our authorized representatives

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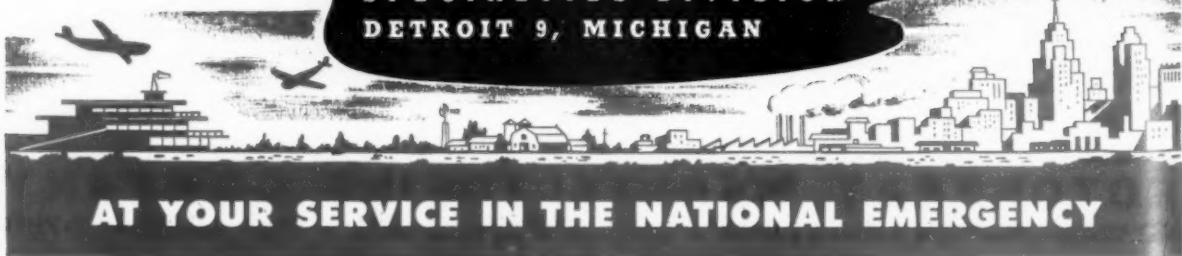
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AT YOUR SERVICE IN THE NATIONAL EMERGENCY

PERFECTION NAMES SALES V. P.

Perfection Stove Company announced the appointment of J. H. Rasmussen as vice president-sales of all Perfection cooking and heating appliances.

Rasmussen has been in the appliance field since 1925. Since 1947 he served as president and sole owner of the J. H. Rasmussen Co., manufacturers representatives, with headquarters in the Merchandise Mart, Chicago, handling nationally-known brands of water heaters, air conditioning systems, radios, television sets, etc.

It was also announced that C. H. Foulds will continue as vice president in charge of contract and automotive sales for Perfection Stove Co.

U. S. S. DISTRIBUTES BOOK

United States Steel Corp. has issued a 228-page book, "Steel Serves the Nation", commemorating the firm's 50th anniversary.

The book depicts the growth and accomplishments of U. S. Steel since 1901.

GENERAL ELECTRIC PROMOTES

FOUR

Clayton P. Fisher, Jr. has been appointed manager of materials and purchasing for General Electric Company's major appliance division at Bridgeport, Conn. He succeeds Lee D. Nutter who has been transferred to New York City as manager of major appliance sales in that district.

C. Howard Black was named gen-

eral manager of the company's Meter and Instrument Department, Lynn, Mass., succeeding Harold E. Strang, who was appointed general manager of the G-E Measurements and Industrial Products Division.

AHLMA OPPOSES WASHER TAX

The American Home Laundry Manufacturers' Assn. placed a page ad in the Sept. 24 *Washington Post* opposing excise tax on washing machines.

The tax, reportedly, would add \$25 to \$35 to the retail price of a washer.

AMANA APPOINTS HOME ECONOMICS COORDINATOR

Appointment of Mrs. Barbara Johnston as coordinator of home economists has been announced by Amana Refrigeration, Inc.

Mrs. Johnston will plan and guide activities of Amana's home economists in aiding the firm's distributors and dealers with food freezer demonstrations and sales promotions. She was formerly a therapeutic dietitian at Wesley Memorial hospital, Chicago, and a clinic dietitian and instructor in the Department of Medicine, University of Chicago.

GILLIES IS V. P., GEN. MGR. PHILCO GOV.-IND. DIVISION

In a further expansion of Philco Corp.'s divisionalization program, Joseph H. Gillies was appointed vice president and general manager of the Government and Industrial Division.

it was announced by William Balderson, president. Robert F. Herr, vice president, will continue to head all sales activities of the division, as a general staff executive.

Gillies joined the company in 1929. Since 1948 has been vice president-operations of the Television and Radio Division. In April of this year he also assumed the post of vice president-operations of the newly established Government and Industrial Division. He was a key production executive during World War II, among many other activities responsible for the output of more than 500,000 advanced airborne radar equipment units. He has been a director of Philco since 1947.

YOUNGSTOWN OPERATIONS APPT.

Robert P. Bremner has been appointed assistant to the vice president-operations, The Youngstown Sheet and Tube Co.

Bremner joined Youngstown in 1947 as a member of the raw materials department. Eight months later he was appointed mining engineer to deal with all the company's mining problems.

NEW HOTPOINT CLOTHES DRYER

Hotpoint, Inc. has introduced a new model clothes dryer, the LD-3, which does not send moisture, heat, or lint into the room. Dryer employs principle of condensing moisture from heated air by means of cold water spray. Spray filtering also washes out lint, which together with condensed moisture from clothes, is pumped through rubber hose to nearest sink or drain outlet. This replaces principle of drawing in air and discharging it into room.

SIX NEW DIVISIONS FOR G. E.

Formation of six new operating divisions has been announced by General Electric Company.

The new divisions include the Turbine Division and the Motor and Generator Division, both with headquarters at Schenectady, N. Y.; Transformer and Allied Products

Division, headquarters at Pittsfield, Mass.; Measurements and Industrial Products Division, headquarters at Lynn, Mass.; Switchgear and Con-

trol Division, headquarters at Philadelphia and the Component Products Division, headquarters at Fort Wayne, Ind.

CLOSE NAMED WESTERN EDITOR FOR FINISH



Finish is pleased to announce the appointment of Gilbert C. Close, Hawthorne, Calif., as Western Editor. Close's work is not new to *finish* readers, as he has been serving as West Coast correspondent for six years. In this capacity he has become quite familiar with developments in the appliance and metal products manufacturing industry in that area.

"Gil" Close studied engineering at the University of Minnesota, but left that institution at a time when engineering graduates were literally a "dime a dozen." Consequently, he turned to his typewriter to make a living. For the next 10 years, he turned out reams of short stories and articles for magazines of all types and descriptions.

When World War II broke out, Gil joined the Process Engineering staff of Douglas Aircraft Company where he assumed charge of Process Technical Publications while at the same time engaging in various phases of research work. After leaving Douglas, he became associated with the Navy's Bureau of Aeronautics and wrote technical or-

ders detailing the maintenance of various combat airplanes. When the war was over, Gil became a free-lance technical and engineering writer covering west coast industry for a number of magazines. He has been a correspondent for *finish* during this entire period.

Gil is married, 40 years old, and the father of two lively teen-age daughters. His chief hobby is photography, and he uses one of his four cameras to illustrate many of his *finish* articles.

An "on the job" photo of the new Western Editor.

"We're growing fast in this section of the country," Gil says. "Many of our firms are relatively new and equipped with the most modern production facilities. Our research departments are humming with activities. We have, and will continue to have, a lot to offer in the way of technical data and news of improvements that will be helpful to the appliance industry at large."

Upon the occasion of joining the editorial staff of *finish*, Gil invites the cooperation of all west coast members of appliance and metal working industries to cooperate with him in obtaining pertinent news and interesting technical features for *finish*. He may be contacted by telephoning OSborne 6-9908 at Hawthorne, Calif., or by addressing correspondence to 526 So. Prairie Ave., Hawthorne.

"MAGIC CHEF, INC."

American Stove Company is said to be planning to change its name to "Magic Chef, Inc.," effective December 31. A special stockholders' meeting will be called to approve the change, said the report.

GAS WATER HEATER FIGURES FOR FIRST NINE MONTHS

During the first nine months of 1951, shipments of automatic gas water heaters totaled 1,522,400 units, 11.5 per cent less than the 1,719,500 units shipped during the same period of 1950.

Shipments of electric storage water heaters for the first eight months of the year totaled 648,800 units as compared to 619,400 units shipped during the first eight months of 1950.

Figures are from a report by Gas Appliance Manufacturers' Association.

GRANITE CITY STEEL BEGINS MULTI-MILLION EXPANSION

Work is underway on the new multi-million dollar expansion program of Granite City Steel Co., Granite City, Ill.

The program, to increase production of flat rolled products, includes construction of three new open hearth furnaces, a blooming mill, three new slab heating furnaces, and alterations to the present strip mill.

The continuous slab heaters will be of the new zone-controlled, triple-fired, recuperative type. Each will have an estimated capacity of 100 tons per hour and will be equipped for firing with natural gas, or fuel oil, with full automatic control of combustion, temperature, and furnace pressure.

MAYTAG AWARDED ADDITIONAL DEFENSE JOBS

The Maytag Co., Newton, Iowa, has been awarded a prime defense contract, two sub-contracts, and a related defense job.

Prime contract is for production of smoke shells and sub-contracts are for radio antennae, radio instrument racks and center guides for tank tracks. The related defense job is for production of precision bevel gears which are already in production, as are high explosive shell base plugs, aircraft manifold couplings and electric wiring harnesses.

The major sub-contract held by the firm is for tank track blocks for

Enthone products for better pickling of steel —

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ACID ADDITION AGENT
STOPS ACID FUMING

ACID ADDITION AGENT

Stops fuming of acids — promotes better wetting — lowers drag-out — saves acid — less harm to operator — less corrosion on surrounding equipment — more uniform pickling effective with sulphuric acid hot and cold — hydrochloric — phosphoric — hydrofluoric acids.

COMPOUND 42

A new cleaning and pickling agent combined—removes oil and rust at room temperature in One operation — prepares metals for painting — inhibits rusting — apply by dipping or brushing.

INHIBITOR 8

A new complete inhibitor to stop attack on base steel — high inhibition in sulphuric—hydrochloric—phosphoric acids —lowers surface tension—less drag-out —saves acid—reduces rusting after pickling — reduces fuming — bright pickling — makes pickling a more pleasant and healthful operation.

COMPOUND NR-37

Prevents rusting during drying but leaves no residue — added to hot or cold water it permits drying without rusting and leaves steel clean for painting — very effective for porous castings.

ENTHONE

INCORPORATED

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NEW HAVEN, CONNECTICUT

Write for Check List
Sixty Products and Processes
for Metal Finishing

which a new building is now being constructed at Newton.

A. C. Danekind, chairman of Maytag's War Mobilization Planning Committee said it is expected that

LEAKE STAMPING COMPANY PRESIDENT TO SERVE AS FINISH TECHNICAL CONSULTANT

The editors of *finish* are pleased to announce that, effective immediately, James M. Leake, president of The Leake Stamping Company, Monroe, Michigan, will serve as technical consultant to *finish* on editorial material pertaining to metal stamping techniques and the general subject of metal fabrication.

Mr. Leake has spent his lifetime in designing and producing metal stampings. He was formerly associated with a number of pioneer metal stamping firms in engineering and administrative capacities. In 1940 he organized his own company, and in ten short years, his aggressive leadership has successfully built an organization of over 200 employees.

Mr. Leake is a member of the Society of Automotive Engineers; American Ordnance Association; Quartermaster Association; Job Stampings Industry Advisory Committee of the National Production Authority, Department of Commerce; Past Toledo District Chairman, Member of Committee on Industrial Mobilization, Technical Research and Standards Committee and National Director at large of the Pressed Metal Institute and the Fragmentation Bomb Integrating Committee of World War II.

His company carried out an extensive production program during World War II, including the forming of thousands of parts vital to all branches of the military. Production of many parts again is under way for the defense program. The company is a member of the American Ordnance Association, Quartermaster Association, National Association of Manufacturers, National Metal Trades Association and the Pressed Metal Institute.

As *finish* continues to present feature editorial material pertaining to the technical and practical aspects of metal stamping, in the form of

all jobs will be in full production the latter part of the year with a potential billing at an annual rate of about \$23,000,000.



either "defense features" or practical information for peacetime application, our readers will have the benefit of the sound advice and counsel of this acknowledged leader in the metal stamping field.

(See "How Modern Stamping Techniques Can Help Conversion" by James M. Leake, May 1951 *finish*.)

FOREIGN METALLURGISTS VISIT U. S. STEEL CO.

Foreign metallurgists from many nations recently visited the world's largest steel mill, U. S. Steel's Gary Works, as part of the World Metallurgical Congress. In the group were metallurgists from England, Japan, Italy, India, France, Yugoslavia, Turkey, Germany, The Netherlands, Denmark, Norway, Belgium, Switzerland, Chile, and Luxembourg.

BETTER, LOWER COST SYSTEMS OBJECTIVE OF HEATING SCHOOL

How to reduce the cost of a forced circulation hot water heating system for a typical six-room insulated house by more than \$400 is demonstrated to students who attend the three-day School of Modern Heating sponsored by The Institute of Boiler and Radiator Manufacturers.

Launched in April, 1950, the school has brought latest information on de-

sign and installation of hot water and steam heating systems to more than 3,200 students in 63 cities.

It is reported that almost one-third of a million dollars and 13 years of research have gone into the preparation of the I-B-R Installation Guides and other instructional material used in the course. One of the chief objectives of the course is to show students how to sell, design, and install better systems at lower cost.

DOMESTIC GAS RANGE SHIPMENTS DOWN

Industry shipments of domestic gas ranges during the first three quarters of 1951 approximated 1,786,400 units, 19.2 per cent less than for the same period of 1950, according to Gas Appliance Manufacturers' Association. Shipments during September, 1951, totaled 182,800 units as compared to 278,000 units in September, 1950.

FERRO SALES-SERVICE MEMBER

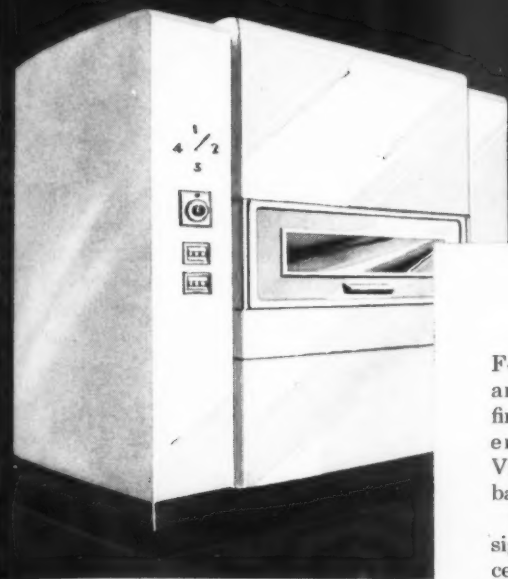
Ferro Corporation announced the addition of Grant E. Miller to its sales-service staff. Miller has been with Ferro for seven years and for the past year has been supervisor of the firm's development laboratory.

HEADS INSULATION GROUP

G. J. Christner, The Eagle-Pitcher Sales Co., Cincinnati, was elected president and chairman of the board of the Industrial Mineral Wool Institute at its 10th annual meeting on September 26, at Hot Springs, Va. Christner, vice president and general manager of Eagle-Picher's Insulation Division, was vice president and a director of the Institute during the past year.

The 16 member companies of the Institute in the U. S. and Canada manufacture industrial insulation for electric power stations, petroleum and gas refineries, refrigeration and air conditioning installations, and chemical processing plants.

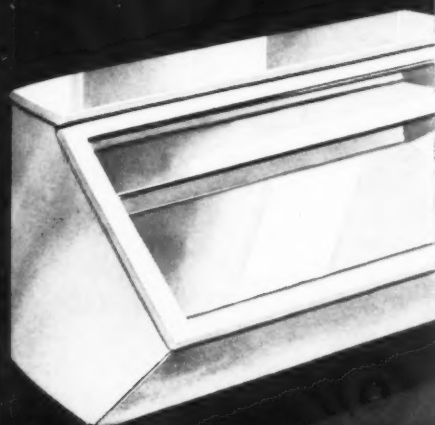
Others elected at the Hot Springs meeting were H. W. Elkins, Owens-Corning Fiberglas Corp., Toledo, vice president; and Frank Christenson, Refractory & Insulation Corp., New York, treasurer. New directors are



For strength, durability and appearance of their finished products, enamellers have found U·S·S Vitrenamel steel the ideal base material.

U·S·S Vitrenamel is designed to provide the porcelain enameling industry with a product possessing the essential physical properties, and having a surface texture that will insure maximum adhesion.

And the U·S·S Vitrenamel label is an added sales point for porcelain enameled products made from this quality steel.



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TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM • UNITED STATES STEEL EXPORT COMPANY, NEW YORK

UNITED STATES STEEL

Elkins; E. R. Stevens, Baldwin-Hill Co.; R. E. Daniels, The Federal Portland Cement Co.; and N. L. Morell of N. L. Morell.

JOY ELECTED BOSTITCH V. P.

Kenneth E. Joy, general sales man-

ager, Bostitch Inc., Westerly, R. I., has been elected vice president-sales.

U. S. PLYWOOD ELECTS MARONEY

Edward J. Maroney, general sales manager, U. S. Plywood Corp., N. Y., has been elected vice president.

HARVESTER CHANGES IN TOP ENGINEERING POSTS



L. H. HINKEL



J. A. GALAZZI



A. R. EDWARDS

A change in top engineering posts of International Harvester's Refrigeration Division has been announced by C. D. Harris, manager of engineering for the division.

A. R. Edwards, formerly of the product engineering group, will head a newly established group specializing in experiment and testing. L. H. Hinkel has been promoted from advanced design engineer to assistant chief engineer, Advanced Engineering group; and J. A. Galazzi, also an

advance design engineer, has been promoted to assistant chief engineer, Product Engineering group.

J. S. Palmer will continue as Chief Engineer of the Product Engineering group.

The changes were brought about by the recent resignation of W. E. Mahaffay as chief engineer of the Refrigeration Division's advanced engineering group, to become executive engineer for the Whirlpool Corp.

Because of the shortage of cobalt and other materials used in porcelain enameling, PEI reports, a part of the enameling furnaces in the porcelain enameling industry are now available for prime or sub-contract work involving heat treating of aluminum and steel. PEI points out that many porcelain enamellers successfully converted their furnaces for heat treating operations during World War II and could easily do so again.

DEVILBISS PROMOTES TWO

D. V. Perry, DeVilbiss Company, has been named assistant sales manager of the company's spray painting and finishing division, with offices in Toledo, O. Perry was formerly eastern district manager.

At the same time, C. B. Gracely, formerly manager of the firm's Houston office, was named to the post of eastern district manager, replacing Perry.

Announcement of the appointments was made by H. M. Kidd, sales manager.

HEADS NPA COMPONENTS DIV.

Appointment of Eugene F. McCarthy, Buffalo, as director of the General Components Division was announced by the National Production Authority.

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PEI URGES FURNACE

CONVERSION FOR DEFENSE

As a result of reports that the demand for industrial furnaces during the first half of 1951 was five times as great as during the same period last year, the Government Business Committee of the Porcelain Enamel Institute is stressing the possibility of converting porcelain enameling furnaces to defense heat treating applications.

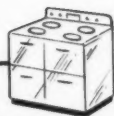
According to PEI, delivery time for new industrial furnaces has been greatly extended as a result of the increased demand, material shortages, and manpower problems, so that there is an increasing need for additional furnaces to take care of growing defense needs.

Continued top column 3, this page

Some of Midwest Enamellers Club members—who toured the New Process D-Enameling Co. plant in Aurora, Illinois, September 28.



FOR PEACE



OR DEFENSE

ACME HAS THE EXPERIENCE

ALTHOUGH the bulk of Acme's production during recent years has consisted of peacetime products, much of it for the appliance manufacturers, we have never discontinued defense production.

During all this period, both during and since World War II, we have been continuously producing precision castings for aircraft, and for numerous complicated ordnance parts.

ACME OF CHICAGO offers a complete casting service—for aluminum alloy permanent mold and semi permanent mold castings and aluminum and magnesium alloy sand castings.

Acme engineers will work with you on problems of design, cost of producing samples, production costs, and cost of patterns or permanent molds to produce high quality castings.

ACME

ALUMINUM FOUNDRY CO.

6837 SOUTH BELL AVENUE

CHICAGO 36, ILLINOIS

TELEPHONE — PROSPECT 6-5035

McCarthy replaces Samuel N. Comly, who has returned to his position as vice president and treasurer of the Russell, Burdsall & Ward Bolt and Nut Co., Port Chester, N. Y. Comly had been serving under the rotation policy of NPA, which generally has permitted key men from industry to leave their companies for six month tours of duty with the government to assist in the mobilization program.

The General Components Division has basic responsibility for the allocation of controlled materials to concerns that make such items as bolts, nuts, bearings, hand tools, valves, and fittings.

McCarthy had been deputy director of the division. He is on leave from his position as vice president of Beals, McCarthy and Rogers, Inc., Buffalo.

SEVENTH REFRIGERATION, AIR CONDITIONING SHOW TO BE LARGEST; EXHIBITS VALUED AT \$5,000,000

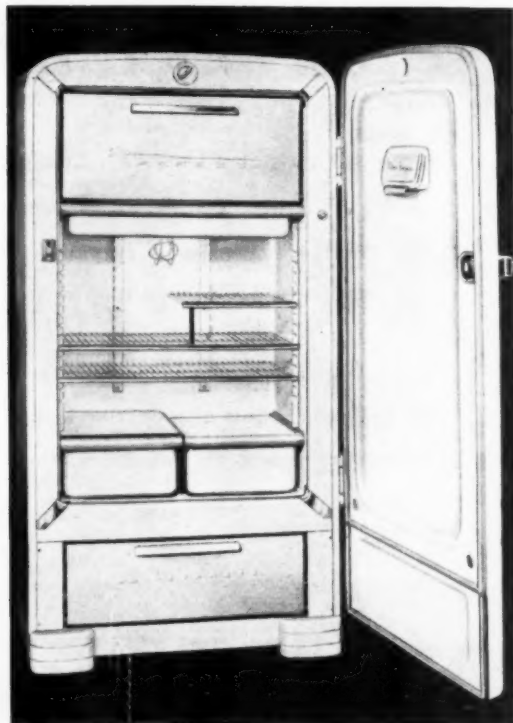
The seventh all-industry Refrigeration and Air Conditioning Exposition at Navy Pier, Chicago, November 5 to 8, is reported by L. C. McKesson, general chairman, to be the world's largest display of its kind. Exhibits are valued at \$5,000,000.

More than 200 manufacturers have leased over 54,000 square feet of space to show latest development and design of their products.

Items shown will include large walk-in coolers, display cases, water coolers, home and farm freezers, milk coolers, ice cream equipment, room air conditioners, dehumidifiers, etc., as well as component parts such as controls, compressors, condensing units, refrigerants, oils, belts, valves, fittings, and accessories.

Manufacturers' personnel will be on hand at each of the booths.

PERFECTION STOVE ADDS REFRIGERATORS TO PRODUCT LINE



Perfection Stove Company recently announced the addition of refrigerators to its line of products. A 9-cubic ft. and a 10-cubic ft. refriger-

ator have been introduced.

Both models have all-steel cabinets, of welded construction, with acid-resistant, porcelain enameled liner.

Both contain hermetically-sealed condensing unit externally rubber mounted and internally spring mounted, with 3-inches of insulation on all sides.

PEMCO AD CAMPAIGN GETS RECOGNITION BY PRINTER'S INK

A two-page editorial spread in the September 28 issue of *Printers' Ink* featured the current advertising campaign (now running in *finish*) for Pemco Corporation, Baltimore, Maryland.

Under the heading "How industrial advertiser is giving technical ads consumer flavor" Nathan Kelne, associate editor of *PI*, explains how Pemco's new ad agency, Brindley-Roth, Detroit, has made a "switch in technique" and developed advertising for the client where "human interest" art and copy replace some engineering details by showing benefits.

The advertisement featured to represent the new technique is headed "Dad's Special Recipe". This advertisement appeared originally in the August issue of *finish*.

DEVILBISS ISSUES ROTOGRAVURE BROCHURE

"Sprayways", a graphic 16-page rotogravure brochure introduced by The DeVilbiss Co., is being distributed to industrial executives, distributors, jobbers, libraries, schools, technical organizations and others interested in the varied uses of spray painting equipment.

The publication which had an initial press run of 100,000 has a cover photograph of a recent DeVilbiss development, a traveling spray booth being used for the finishing of a diesel locomotive. The brochure is a ready reference to many DeVilbiss spray equipment uses and is designed to fit standard file folders.

DeVilbiss, long recognized as a leader in the spray equipment field, inaugurated the publication to acquaint manufacturers and others with the many new uses for the equipment, said E. F. Frey, director of sales promotion and advertising.

HEADS PURCHASING FOR CROSLEY NASHVILLE PLANT



Dale C. Hergert has been named acting purchasing agent for the Nashville plant of Crosley Division, Avco Manufacturing Corp., according to an announcement by W. R. Lawrence, Jr., general manager.

JAMES INGERSOLL NAMED V. P. OF INGERSOLL PRODUCTS DIV.



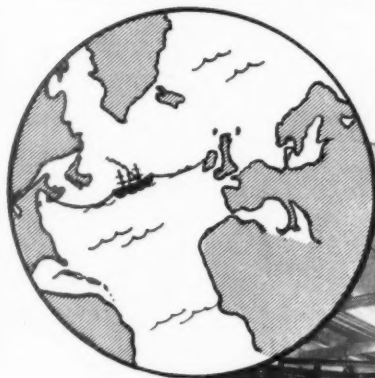
James H. Ingersoll has been elected vice president of Ingersoll Products Division of Borg-Warner. He previously was assistant to the president of the division.

ALFRED U. TO BUILD CERAMICS LAB

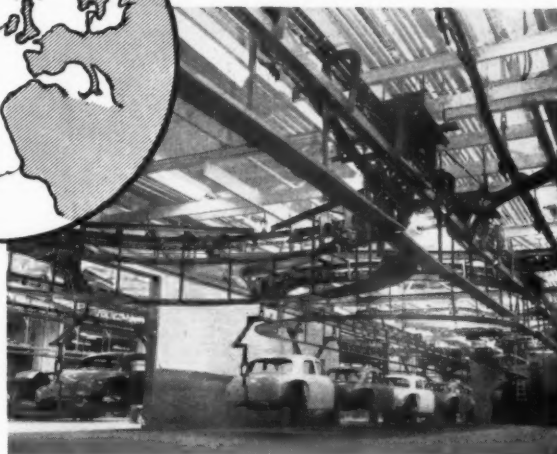
Trustees of Alfred University and the State University of New York have announced plans for erection of a new classroom and laboratory building for the New York State College of Ceramics at Alfred Uni-

to Page 70 →

The **FIRST** Cable to link the Old and New Worlds



was completed by Cyrus W. Field, Aug. 5, 1858—revolutionizing then existing communications.

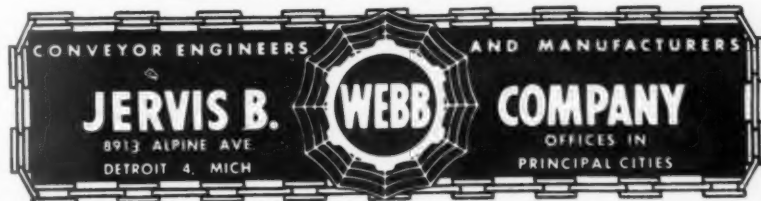


JERVIS B. WEBB COMPANY was the **FIRST** to develop **POWER and FREE CONVEYORS** —an outstanding development in materials handling.

More important than movement from "here to there" is the "pacing"—the setting up the movement of materials so the operators can work in rhythm. Webb Power and Free Conveyor Material Handling Systems give this "rhythm"—yet allow off-the-line placing of loads to desired points without interrupting the flow. They reduce costs, increase efficiency and productivity.

Offering complete flexibility in meeting production problems, Power and Free Conveyors can be tailor-made to your requirements—for any plant large or small. Some of their advantages include:

- Loads are pushed, rather than carried, on Webb "Power and Free Rail" conveyors.
- Manual or automatic switching of loads either from or to the main "Power" line.
- Loads may be lowered vertically from the "Power" line . . . anywhere along the route.
- Automatic dispatching of loads to distant points by pre-setting carriers for a given destination.
- Accumulation of loads for "banks" by gravity from "Power" line to "Free" line eliminates floor storage space waste.
- Momentary stopping of loads anywhere along the route, by disengaging "Free" trolleys from "Power" pushers



Metal stampers meet in Chicago

(Continued from Page 47)

steel as well as between the various consumers of steel.

"There is disagreement, however, concerning the distribution of the steel that is left over after direct military needs have been taken care of. Should the federal government control this distribution from Washington or should private industry, which has the responsibility of making the steel, also have the responsibility of

distributing it equitably and effectively. . . .

"Government control is wasteful, arbitrary, and often subject to political pressure. Furthermore, government cannot be closely in touch with the hundreds of plants that make steel or the thousands of plants that consume it. Given the opportunity, I believe the steel industry is better qualified to do the job faster, cheaper,

more efficiently, and—if the experience of the last few months is any criterion—with considerably less confusion," said Chapple.

Continuing, the speaker said "However, the route of more complete controls was chosen and we, today, are living within the boundaries of the Controlled Materials Plan. Until these regulations are changed, CMP constitutes the only legal means at our disposal for this nation to accomplish its 'butter and guns' objective. . . .

"It seems to me that our answer lies in intelligently applying ourselves to the development of a program which, while it has as its ultimate objective the elimination of controls, nevertheless in the meantime permits us to devote our time and energy to the task of defending our country and our economy.

Fundamentals of program for defending country and economy

"You may well ask, what would be fundamental in such a program?

"First, it is absolutely essential that production be maintained at its highest level, and that the product mix be directly related to the needs of the entire economy, both military and civilian.

"Second, direct defense requirements must be handled regardless of the impact on non-defense requirements.

"Third, every effort must be made to develop complete realism in the amount of steel required to support today's total economy. In other words, how much inflation is there in the requirements as stated today?

Steel expansion


"The steel industry has spent 5 billion dollars since V-J day in expansion and improvement in its steel-making facilities. Total ingot production for the year was almost 97 million tons. That was a 28% increase since 1940. It was 9 million tons more than the average tonnage produced in the peak war years. It was almost half of all the steel produced in the world in that year—47.7% to be exact.

"This year's production will come

Almost as if by
MAGIC!
It's startling to see the RANSBURG No. 2
Electrostatic Process in operation

The paint particles are so tiny they're hardly visible as they leave the head where they are simultaneously atomized and charged electrostatically. However, the articles being coated take on color, right before your eyes—*almost as if by magic*—as they move along the conveyor line past the Ransburg unit.

The new RANSBURG No. 2 Electrostatic Process eliminates wasted paint . . . makes possible new economies, new efficiencies heretofore unattainable. The No. 2 Process cuts paint and labor costs . . . increases production rate with improved quality . . . greater uniformity.



NO OVERSPRAY TO BE EXHAUSTED
NO COMPRESSED AIR USED
NO OPERATOR SKILL REQUIRED

● Get the facts. Write for a copy of our brochure containing complete data on the RANSBURG No. 2 Process.

Electrostatic Painting Processes

RANSBURG ELECTRO-COATING CORP.

Indianapolis 7, Indiana

RANSBURG

to approximately 104 million tons.

"The expansion program projected for the next few years is equally great. It will cost another reported five billion dollars by the end of 1952, and during 1953 will reach a steel-making capacity of approximately 118 million tons. That is nearly half again as large as when World War II began, and nearly 1/5th larger than when it ended," concluded Chapple.

American impressions of the British stamping industry

Friday morning's session, as well as the luncheon session, was devoted to talks by members of the American ECA Stamping Team which visited British stamping plants during the past summer.

At the morning session, the following team members presented their views: James M. Leake, of Leake Stamping Company, Monroe, Michigan; J. Walter Gulliksen, Worcester Pressed Steel Company, Worcester, Mass.; Carl E. Johnson, of Larson Tool & Stamping Company, Attleboro, Mass.; Raymond Peterson, Peterson Engineering Company, Cleveland; and Thomas L. Baker, National Stamping Company, Detroit.

At luncheon, these team members discussed their tour of Britain: Warren Peterson, Peterson Products Corp., Chicago; F. C. Greenhill, Acklin Stamping Company, Toledo; and J. P. Molony, International Executive Board, U. S. Steel Workers of America. Other members of the team included Rex May and Orrin B. Werntz.

The consensus of the team was that while the stamping industry in England was aware of modern production methods in American plants, they generally "just hadn't gotten around to it."

Britain's apprentice plan

One of the practices in the British industry which the team felt could be used to excellent advantage by American stampers is an apprentice plan which assures their industry of a plentiful supply of young craftsmen. In England, it was pointed out, all companies participate in this plan. The young apprentices are urged to

to Page 73 →

LESS DOWN TIME

WITH

SPARKLER FILTERS

A matter of minutes not hours for a complete change of plates in a Sparkler filter.



No shut down of production to dismantle and clean each plate separately, then reassemble the complete filter, with hours of lost operating time and a messy clean up job.

The complete plate cartridge assembly is hoisted out of the Sparkler filter tank and a clean set of plates lowered in position and the filter is working again in a few minutes. Can you do this with your present filter?

One Sparkler filter with an extra set of plates is equal to two filters for continuous operation in most chemical production line installations.

Write Mr. Eric Anderson for personal engineering service on your particular filtering problem.

SPARKLER MANUFACTURING COMPANY

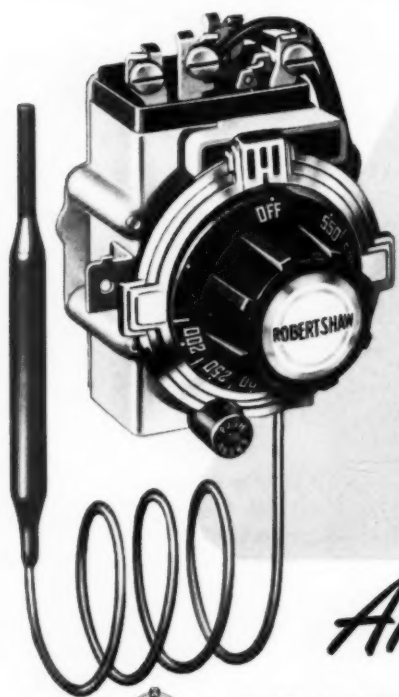
Mundelein, Ill.

European plant: Herengracht 568, Amsterdam, Holland

Makers of
Filters for the
Chemical,
Pharmaceutical,
Food and
Petroleum
Industries
for over
a quarter of a
century.



Seminar on cold forming—held recently in the home office of Parker Rust Proof Co., Detroit. James Leland, manager, cold forming division, is shown explaining a new development in shell case manufacture using the company's phosphatizing compound. Leland's audience consisted of men working with manufacturers' problems in the field daily in sales, research, engineering or service capacities.



IT'S

1. A THERMOSTAT

2. A LIMIT CONTROL

3. A SWITCH

Robertshaw®

MODEL H-1

All-in-One



1. CYCLES AS THERMOSTAT



2. AUTOMATICALLY CUTS OUT AT SET LIMIT



3. STAYS OUT UNTIL MANUALLY RESET

Robertshaw Model H-1 combines in a single unit a thermostat and a limit control. It's a double pole, single throw controller with an auxiliary single pole, single throw switch that automatically cuts off all current and locks the switch in an open position whenever the temperature exceeds the operating temperature range by as much as 7°F. in liquid or 12°F. in air.

Model H-1 has many industrial and product applications.

Write for Catalog H-1

In home and industry...EVERYTHING'S UNDER CONTROL

Robertshaw

THERMOSTAT DIVISION

ROBERTSHAW-FULTON CONTROLS COMPANY
YOUNGWOOD, PENNSYLVANIA



NEWS → from Page 67

versity. Cornerstone laying ceremonies took place October 20.

FERRO ADVANCES NOBLE

The appointment of William N. Noble as assistant to the president,



Ferro Corporation, Cleveland, was announced by C. D. Clawson, president.

Noble joined Ferro in 1933 as a member of the laboratory staff. He served in research and development capacities until 1947 when he was made manager of the frit division.

Noble graduated from the University of Illinois with a B.S. degree in ceramic engineering, and joined the Seeger Refrigerator Company, St. Paul, Minn. In 1928 he joined Chicago Vitreous Enamel Product Co. as a ceramic engineer, and later worked for the A. O. Smith Corp., Milwaukee, before joining Ferro. During World War II he served for three and one-half years as a captain in the U.S. Army Chemical Corps.

Finishing operation at Maytag

(Continued from Page 25)

phosphatizing machine, they pass through a 100' dry-off oven running parallel to the machine. The dry-off oven is heated by exhaust air from two paint ovens to about 250°F.

4500-foot conveyor

A single conveyor system, 4500 feet long and incorporating four drives, transports the parts through the entire organic finishing department. This paint conveyor travels from fabrication through cleaning, drying, finishing (application and baking) to fabrication.

Special conveyor hangers have been designed to carry all parts — from 128 springs or 30 door handles to a complete cabinet.

Application and baking

As the paint conveyor leaves the dry-off oven it drops to the ground floor level and passes through a blow-off area to take care of any pockets or areas that may have failed to drain properly. Tack rags are then used to clean critical parts such as cabinet lids and lid bases.

Then follows the prime coat spray booth. From spray, the parts ascend to the overhead prime coat baking oven. There is 700 feet of oven conveyor chain and the speed gives the ware a 40 minute bake at 340°F.

The conveyor then returns to ground floor level and carries the parts for about 6 minutes of cooling and hardening before entering a sanding tunnel. After the hand sanding for removal of any spots or runs, tack rags are again used to remove all sanding dust.

The parts then go immediately into the finish coat spray booth.

Following finish coat application, the ware is again carried to second floor level and into the finish coat oven—700 feet with a bake of 40 minutes at 310°F.

Down again comes the baked ware to an on-the-chain inspection area flooded with fluorescent light. Any rejects are taken off the chain and returned through the sanding tunnel only 20' away.

All okayed ware continues to the finish

assembly floor. All painted parts are scheduled through the organic finishing department in groups or "sets" to meet assembly line requirements and minimize storage.

Raw materials handling

Paint is purchased in carload lots and stored in drums on off-the-floor barrel racks.

Four mixing tanks are provided.

two for primer and two for finish coat. For the same type of material mixing is done in one tank while the material is being used from the other. The paint is pumped through pipes to the spray booth. The circulating system uses a 20 lb. pressure at the manifold.

For application a 16 lb. fluid pressure is normally used with 70 lb. air pressure (depending upon capacity of the gun).

Reclaiming materials

over →



"Paw sez ef VEDOC Defense Paint is good fer Army bombs an' rockets it should be jest right fer corn-squeezin's."

We don't go along with Paw's use of Vedoc Defense Paint here. But for Defense Contracts you have—or may get—our government specification finishes will fill the bill. Our World War II experience, combined with postwar research and increased facilities, enables us to offer you the best in Defense Paint. Your orders receive our prompt attention—whether they're for gallons or drums. Write today for samples and prices!

Remember, Ferro Is Set Up to Provide Complete Organic Coatings Service. From the Development of Diversified Protective Coatings—to the Designing and Installing of Efficient Finishing Oven Systems.

FERRO

CORPORATION

LIQUID PLASTICS DIVISION

4150 East 56th Street • Cleveland 5, Ohio



→ from Page 71

All paint overspray is collected from the water wash spray booth and feeds to large pits in the center of the spray room. Pits are 3' deep by 5' wide by 60' long and have a capacity of 7000 gallons. The paint floats on recirculating water. Sludge is collected twice a day and loaded into barrels (covered with water for seal) and returned to the paint supplier for reclaiming. Water used in the water wash spray booths is kept

on the alkaline side to promote circulation and flotation.

In the porcelain enameling department ground coat overspray is collected, remilled with slight mill additions, run through centrifugal sieve and magnetic separator and then blended with fresh ground coat to be used for dipping (up to 50%).

Cover coat collection is made separately for the zirconium and titanium enamels. The cover coat enamel is kept clean and blended in stainless

steel drums with portable mixers. Gravity is checked and laboratory test plates are made to check for contamination. From the blunger (blender), the reclaim slip passes through a centrifugal sieve and magnetic separator to pressure tanks. The reclaim is added to the tanks in proportion of 25% reclaim — 75% new slip. Set and gravity are checked in the mill room but laboratory checks also are made.

One of the most important features of the finishing departments is the balancing of production (in sets) to meet production line requirements during peak production periods without requiring banks of finished parts.

PREPARATION OF ALUMINUM

An automatic plating machine installed near the paint and porcelain enameling departments is one of the most important pieces of equipment in the finishing process of Maytag automatic washers.

The equipment is vital in finishing washer lids, lid basins, all aluminum parts, handles, inlet spouts and bottom plates. A chromate-phosphate coating of about .0001 inch is used to promote good adhesion of the paint to the metal during the prime coating process.

The automatic equipment can handle approximately 66 various sized parts at one time. Six hangers with washer parts attached are dipped in the tank at one time. There are seven consecutive tanks for processing the metal parts before the units are ready for prime paint coating. The first tank contains a cleaner in which the parts are immersed for about 2½ minutes, and from the cleaner the parts go into a hot rinse for 45 seconds and then into a second cold rinse for about 30 seconds. The fourth tank contains the Alodine coating material and the parts here are immersed for about 2½ minutes. Following this, two cold water tanks bathe the parts first for about 10 seconds and in the succeeding tank about 45 seconds. A chromic-acid rinse completes the immersion process and this rinse takes about 10 seconds.

After the parts have been run

*Our plants are part of
your production line*

**HOURLY
QUALITY CHECKS
IN OUR LABS**

**KEEP FIBERGLAS* QUALITY
RIGHT ON SPECIFICATION**

*giving you insulation of
uniform high quality.*

The universal appliance insulation



*Fiberglas is the trade-mark (Reg. U. S. Pat. Off.) of Owens Corning Fiberglas Corporation for products made of or with fibers of glass.

FIBERGLAS INSULATION MADE BY
**OWENS-CORNING
FIBERGLAS**
insulated
OWENS-CORNING FIBERGLAS CORPORATION • TOLLEDO 1, OHIO

through the various baths they go through the dryer section of the equipment for a period of 2½ minutes, from where they are loaded and sent to the main paint line for bonderizing, prime coat and top coat. Bottom plates receive only the primer.

Temperatures in various baths range from 110° to 175° F. in the Alodine to 140° F. in the chromic acid and 175° F. in the cleaner tank. The equipment is completely automatic and one operator can run the machinery. The operator merely hangs the parts on the hangers at the beginning of the immersion process.

Symposium . . .

(Continued from Page 45)

method of checking the solution for soluble iron has been worked out which we hope will show us when the solution should be discarded. To date we have indication that when the Fe_2O_3 content reaches a concentration of .08% the efficiency of the solution is greatly reduced, even though the concentration of sodium cyanide is above that point where it should still do a satisfactory job.

In conclusion, it is indicated that to conserve sodium cyanide certain fundamentals must be followed:

1. Use sodium cyanide and caustic soda together.
2. Use a filter to remove insoluble iron hydroxide.
3. Hold deposition of iron salts to a minimum.

Adapted from a presentation before the Porcelain Enamel Institute Forum.

Metals stampers meet

(Continued from Page 69)

get experience in various firms before choosing the company they would like to build a career with. No company suffers by this plan, as they all participate in the plan which assures plenty of skilled men for everyone.

Movie on rehabilitation

A feature of the morning program was a movie showing how one British firm uses an extensive rehabilitation program to put seriously injured personnel back to work as soon as possible after an injury—within one or two days. The program was said to speed both the physical and mental

recovery of the patients. Not only are they doing something worthwhile, but they also continue receiving an income though "disabled."

All work in the program is designed to keep injured workers in good physical condition. Muscular effort is progressively increased by special rigs and job set-ups which are actually a part of the company's production work. As soon as a worker has fully recovered through work in this special department, he is sent

back to his old job.

All in all, the team members felt that the British craftsmen were doing the best possible under their present economic conditions, and that their own personal ability was tops.

The program for Friday afternoon's session included: Eugene B. Schwartz, PMI Wage Stabilization Counsel; Lindsay Howell, assistant director, NPA General Components Division; and Oliver F. Fancey, PMI Washington representative.

PATTERSON

Satisfactory
EQUIPMENT
for

Enamel Frit GRINDING




PEBBLE MILLS

Batch-type mills operate at low cost and provide ideal grinding performance for enamel frit. Strongly built and smooth-running. Available in a wide range of sizes. Write for details.

CONTINUOUS GRINDING SYSTEMS

Closed circuit grinding of enamel frit provides dust-free operation, finishing to any desired mesh under close regulation. Production costs reduced to the minimum. Air classification or screen separation. Send us your problem.




The Patterson Foundry and Machine Company

East Liverpool, Ohio, U. S. A.

NEW YORK, BOSTON, PHILADELPHIA, PITTSBURGH, DETROIT, CINCINNATI,
CHICAGO, ST. LOUIS, HOUSTON, DENVER, LOS ANGELES, SAN FRANCISCO, SEATTLE

The Patterson Foundry and Machine Company, (Canada) Limited

Toronto, Canada
MONTREAL

A formula for better enameling ...

$$A+B+(-C)+(-D)=X$$

What does X equal?..If:

- A = Frit
- B = Lithium
- C = Firing Temperature
- D = Firing Time
- X = (?)

Frit + Lithium* + Lower Firing Temperature
+ Shorter Firing Time = X
What does X equal?

X = Better Enamels

- Q. What makes X = Better Enamels?
- A. LITHIUM—by METALLOY!
- Q. E. D.



WRITE US about your enamel, glaze or glass problem. Let Metalloy's Ceramic Engineers solve your production equation. Send it c/o Dept. F I

*If it's Lithium . . .
It's Metalloy!



METALLOY CORP., Division
Rand Tower
Minneapolis 2, Minnesota

NEED BURNING TOOLS
FOR DEFENSE PRODUCTION?



**FAHRALLOY
HAS THE ANSWER!**

If you are converting for the mobilization program consult Fahralloy for your burning tool needs. We may have the exact patterns for your needs. If the job requires SPECIAL application FAHRALLOY engineers will quickly and inexpensively design it for you. Either way you'll be getting the finest burning tools possible; tools that mean higher thermal stress protection with correct chromium and nickel analysis . . . practically no weight loss, breakage or warpage . . . minimum bearing area and proper suspension whatever the parts to be enameled. Send today for FAHRALLOY Catalog 48 or write for direct consultation with FAHRALLOY engineers.



THE FAHRALLOY COMPANY
150th & Lexington, Harvey, Ill.

FAHRALLOY
RESISTS HEAT AND CORROSION!

Guaranteed Results

in the

Pickle Room

with

Specification Materials

and

Experienced Service

MANUFACTURERS OF



LEPCO PRODUCTS

Suppliers to Porcelain Enameling Plants
CLEANERS • NEUTRALIZERS
DRAWING COMPOUNDS



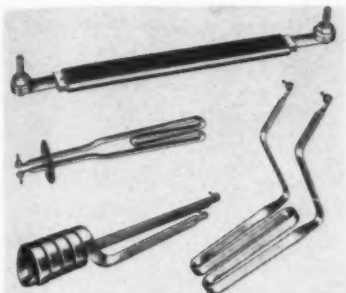
V. B. PUNDERSON COMPANY

402 SWETLAND BUILDING

CLEVELAND 15, OHIO

New Supplies and Equipment

K-11. New electric heating element



The manufacture of a new, very flat, sheathed electric heating element for industrial heating—such as is used with kettles, tanks, ovens, dies, driers and for immersion in liquids—has been announced.

The new type unit provides flat surfaces for contact heating and a thin section for convection and air flow. The 5/32" thick flat surfaces promote efficient radiation effects. They can be supplied with self-regulating characteristics where their wattage will vary inversely with the heater temperature. Copper and steel are standard sheath materials, although other alloys or plating and various coatings can be supplied.

K-12. Advanced machining method for milling cast armor plate



A new type of solid carbide indexable blade face milling cutter has been added to the line of Futurmil face milling cutters, designed for milling cast armor plate, such as tank hulls, and other difficult steel machining jobs.

The cutter retains the Futurmil

More Information

For more information on new supplies, equipment and literature reviewed here, fill out the order form on page 76, or write to us on your company stationery.

principle of multiple production runs without cutter grinding, the solid

carbide blades, when dull, being merely indexed to a new cutting edge since the clearance angles are taken care of by the position of the blade in the cutter body rather than being ground onto the blade. The blade is square and is furnished in three optional sizes ranging from 1" to 3/4", depending on the depth of cut desired. The blade can be indexed 8 times before re-grinding, which is then done on a gang set-up on a surface grinder.

K-13. New deflector makes loading more nearly automatic



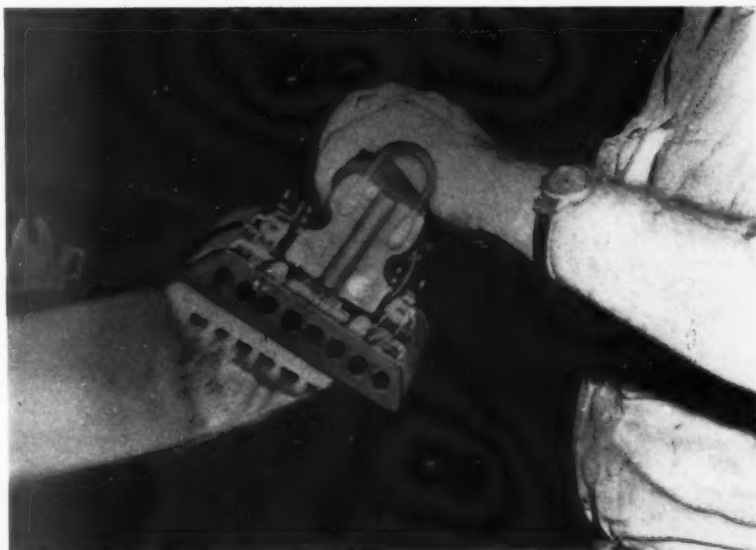
A new deflector that makes truck and carloading more nearly automatic is attached to the platform end of a telescoping portable conveyor. The deflector automatically guides

cartons off the indoor permanent conveyor and shunts them, at a 90 degree angle, onto the portable telescopic conveyor which extends into truck, trailer or boxcar.

K-14. Sander provides new way to finish welded seams

This straight-line action air sander is said to speed the finishing of weld-

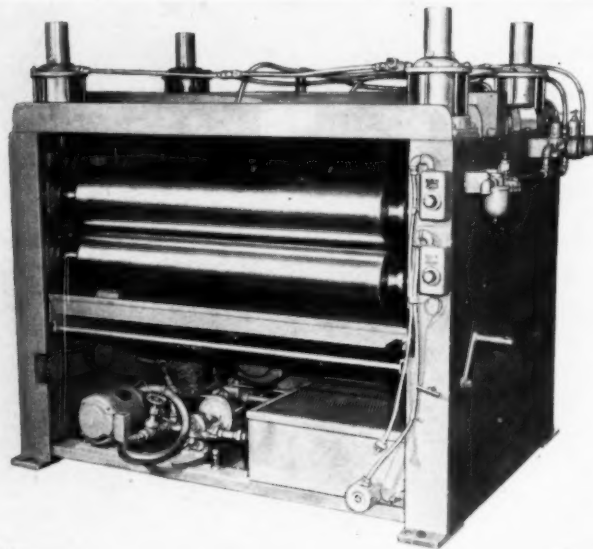
ed seams to produce a smoother job. The sander is said to remove scratch-



es, defects, and leaves no swirls or pressure marks. The seam is grained and blended-in perfectly after assem-

bly. Grinder marks are quickly removed and the metal is properly conditioned for painting.

K-15. Drawing compound roller coating machine to fit any need



The function of this roller coating machine, designed to fit any need, is to uniformly apply drawing compounds to sheet steel prior to drawing operations. The machine shown is equipped with three pairs of rolls.

The first pair is of hardened steel, and is used for deburring the stock. The second pair is neoprene-covered, and is used for actual application of the compound. The third set of rolls is of hardened steel, and is used primarily as squeegee rolls for wiping off excess compound and for forcing remaining compound into the pores of the metal.

It is stated that operating factors

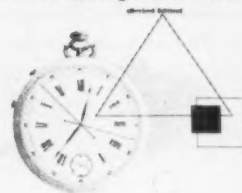
of this machine result in economies such as an increase in die life due to the uniformity of application, reduction of rejects and a substantial increase in production at lower cost.

Industrial literature

111. New 24-page book on cutting materials handling costs

A new 24-page booklet, titled "The How Book of Cost Cutting Materials Handling" contains a large portion concerned with basic background material covering types of skids, pallets

the how book of cost-cutting materials handling



and other industrial handling tools. Most of the balance of the book covers a comprehensive plan for evaluating present handling methods through an engineering analysis much like a time and motion study. Enclosed in the book are several charts and summary sheets for making a materials handling analysis.

112. "Defense Production Data"

A factual 52-page booklet contains data on defense production experience gained in World War II and supplemented with new manufacturing and processing techniques. "Defense Production Data" is profusely illustrated, and covers heat treating and metal working operations involved in producing shells, rockets, guns, ammunition, aircraft parts, tank parts and other defense items.

113. Replacement for sodium cyanide in pickling for porcelain enameling

Free information is available on a new product suggested to replace sodium cyanide in the porcelain enameling pickling line. The new product is said to be a relatively non-toxic replacement for sodium cyanide for the removal of iron salts. Readers who object to the use of sodium cyanide will be interested in checking on this new product.

114. Carton stapler catalog

A free catalog is available showing how staplers can be used to close filled cartons from the outside, and how this results in shortening time and saving money. The catalog shows both portable and stationary equipment, and how it is adaptable for use on the conveyor line.

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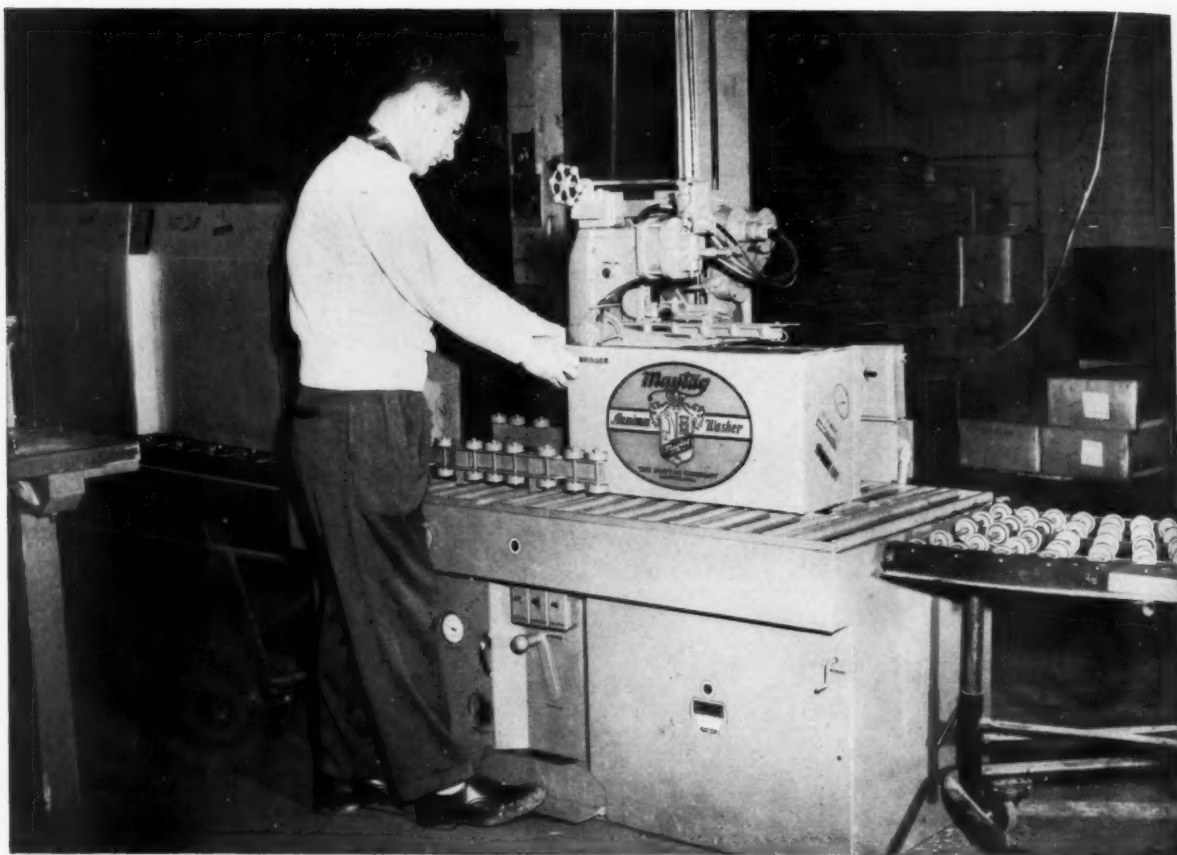
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We showed them that the Machine would close filled cartons from the outside . . . tops and bottoms simultaneously. Test shipments were made to prove that the closures were secure and that the cartons would arrive as fresh as they left.

They were referred to The Consolidated Freight Classification and Postal Regulations which approve our method of closure. It was arranged that

they visit other nearby plants to see our machines in actual operation . . . and other installations were "brought" to them on our sound motion picture film.

It was pointed out that great savings would be effected in both space and time, since all cartons remain flat until ready for use, and in most cases no adjustment is necessary for closing cartons of variable size . . . and that one machine with one operator could close an entire plant's output.

May we also have the opportunity of proving to you that the International Retractable Anvil Staple Machine affords the finest, most secure and most economical method of closing cartons in the world today?



EST. 1938

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safe transit

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Plant experience information for all executives and plant men interested in the problem of packaging and shipping improvement and loss prevention.

Complete information on the National Safe Transit pre-shipment testing program for packaged finished products, and detailed progress reports of divisions and sub-committees of the National Safe Transit Committee.

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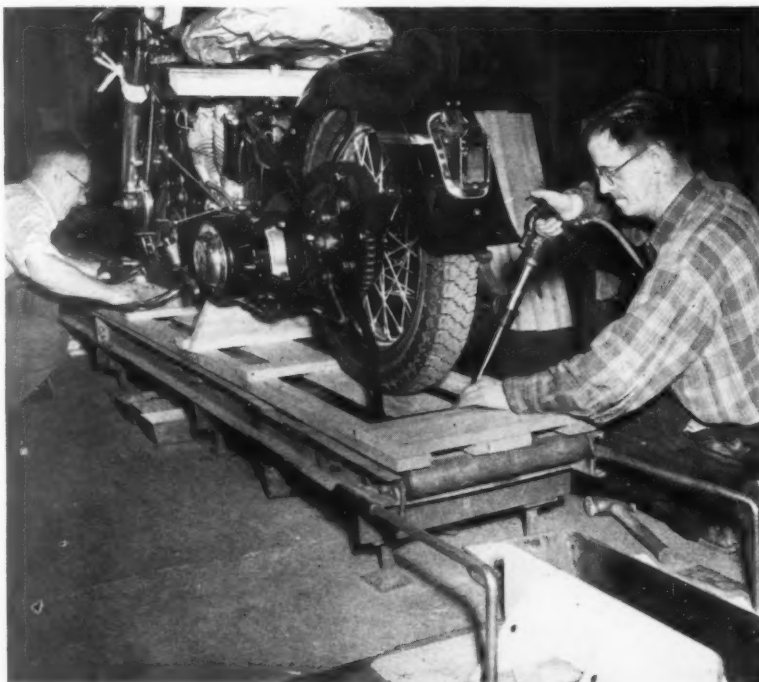
SUBSTITUTION AND THE PACKAGING ENGINEER by W. J. B. Ister.....ST-22

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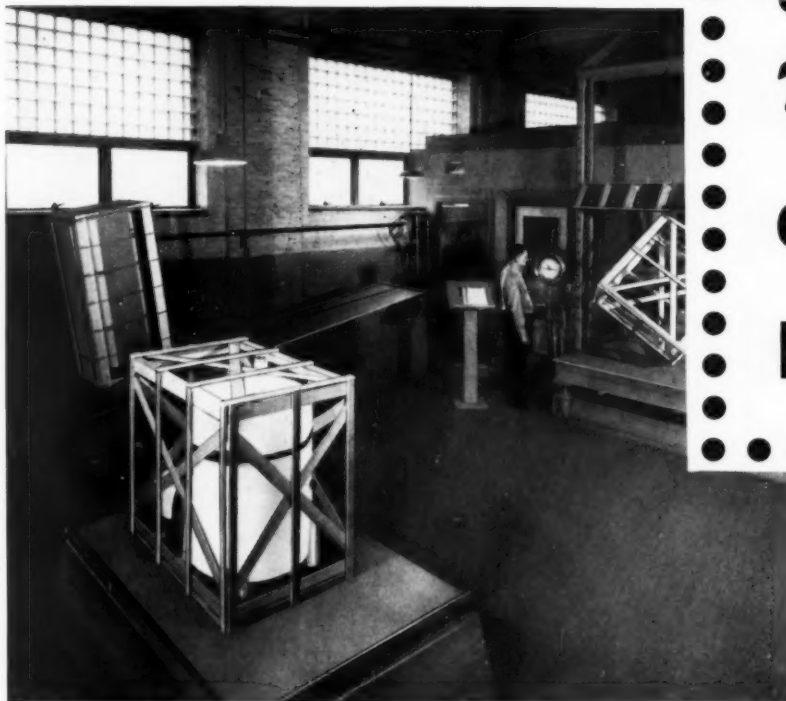


End of the production line—for Maytag automatic washers shows them being packed for shipment. A detailed article on packaging, shipping and materials handling practices at The Maytag Company will appear in a later issue.

A power tool—is used to firmly staple the rear stand of a motorcycle to the base of its shipping crate to help prevent shifting during shipment or handling (story on Page ST-5).



● Section of the Chicago Mill and Lumber Company Testing Laboratory. This Laboratory is certified by the National Safe Transit Committee.



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SENDING your crated product through the Chicago Mill and Lumber Company Laboratory is like taking out an insurance policy for safe delivery.

Experienced engineers and crate designers use the latest in testing equipment to search for weaknesses that may result in transit damage to your valuable finished products.

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Chicago Mill has the most diversified line of boxes and crates in the country. The most adaptable and economical will always be recommended.

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• Greenville, Mississippi
• South Fork, Colorado

• Rockmart, Georgia
• Chicago, Illinois

Packaging method for completely assembled products

POWERFUL motorcycles weighing approximately 600 pounds are shipped in 113-pound crates from the Milwaukee factory of the Harley-Davidson Motor Co. almost completely assembled so that they are practically ready to ride as soon as they reach destination.

Packaging such a machine could be a time-wasting and cumbersome process except for intelligent packing room organization and the use of shipping containers scientifically engineered for speedy use in minimum floor space, as well as to provide thorough protection to their contents.

Packaging a motorcycle in 36 man-minutes

As it is, the Harley-Davidson pack-

ing room is so well organized that only 36 man-minutes are required to package a full-size motorcycle in a crate that provides a ratio of about one pound of tare weight to six pounds of "pay load".

The company converted to its present crating method late in the summer of 1950 for domestic shipments and was so impressed with the immediate results in man-time savings and other economies that it adopted a similarly engineered box for export shipments a few months later.

The first conversion resulted in an immediate reduction of 17 per cent—from 43.2 to 36 man-minutes—in the time required to crate a motorcycle, a reduction in container tare weight from 140 to 113 pounds or

of approximately 20 per cent, considerable saving of factory floor space formerly required, and other economies.

The second conversion, for export shipments, resulted in similar immediate economies, according to Paull Tullgren, chief time study engineer, who was largely responsible for both conversions.

Only 3 interior packing units

The containers are engineered so that only three pieces of special interior packing are required. A trough-like attachment holds the front wheel and a truss-like piece of wood supports the center frame section of the motorcycle. A piece of wood slip-

to Page ST-8 →

These Harley-Davidson motorcycles are nearing the end of the crating process for domestic shipment at the company's Milwaukee factory. At this point on the crating line, only the tops of these crates need be placed and nailed in position.



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But most important, we believe, are the technical facilities of our very complete Container Laboratory in Lawrence, Mass. Certified by the National Safe Transit Program, this laboratory has been serving American Industry for 22 years.

It can serve you in two ways . . . First, in helping to determine the design for your container—in terms of size,

strength, minimum weight, minimum cost and ease of handling. Second, in the regular screening and testing of selected samples of all containers made for you in any of our plants. When you buy your containers from Atlas, our experienced and highly specialized personnel represent your Quality Control on the containers which deliver the goods you make.

Our testing procedures exceed N.S.T. Standards. Four of the more dramatic tests are pictured here; there are many more.

Whatever the size—whether you require one container or a million—and one carload a month or several per day—delivered on schedule to your warehouse or assembly line—we invite the opportunity to discuss your requirements. Your inquiry to Department 11 will receive prompt attention.



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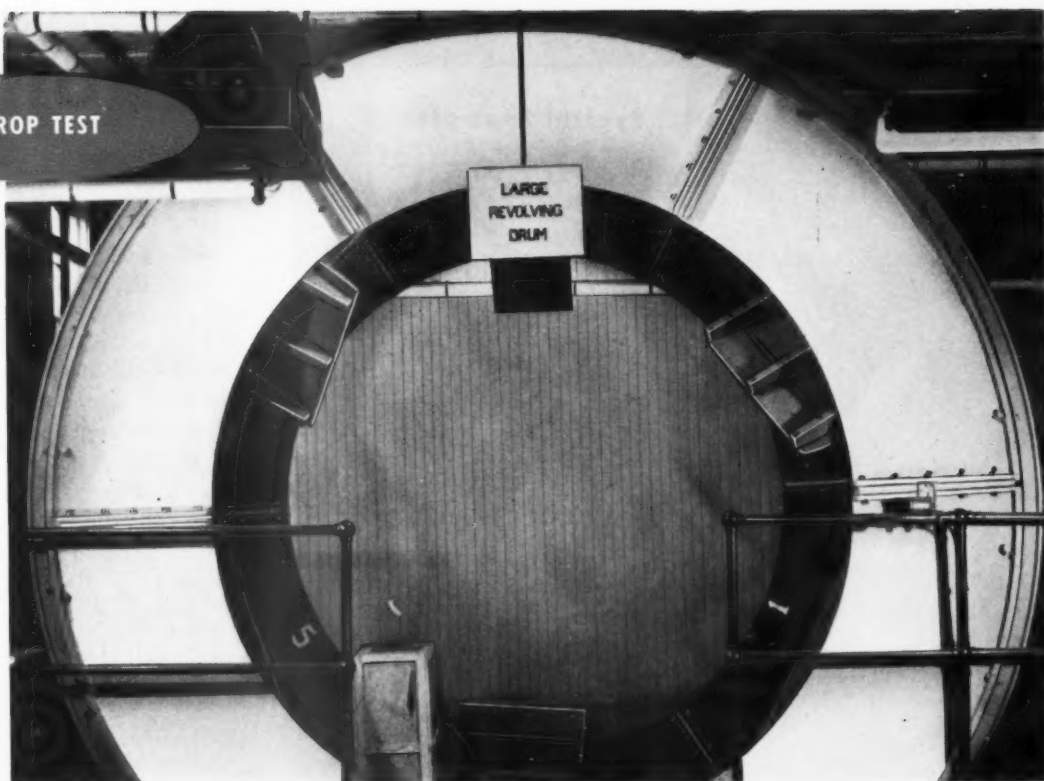
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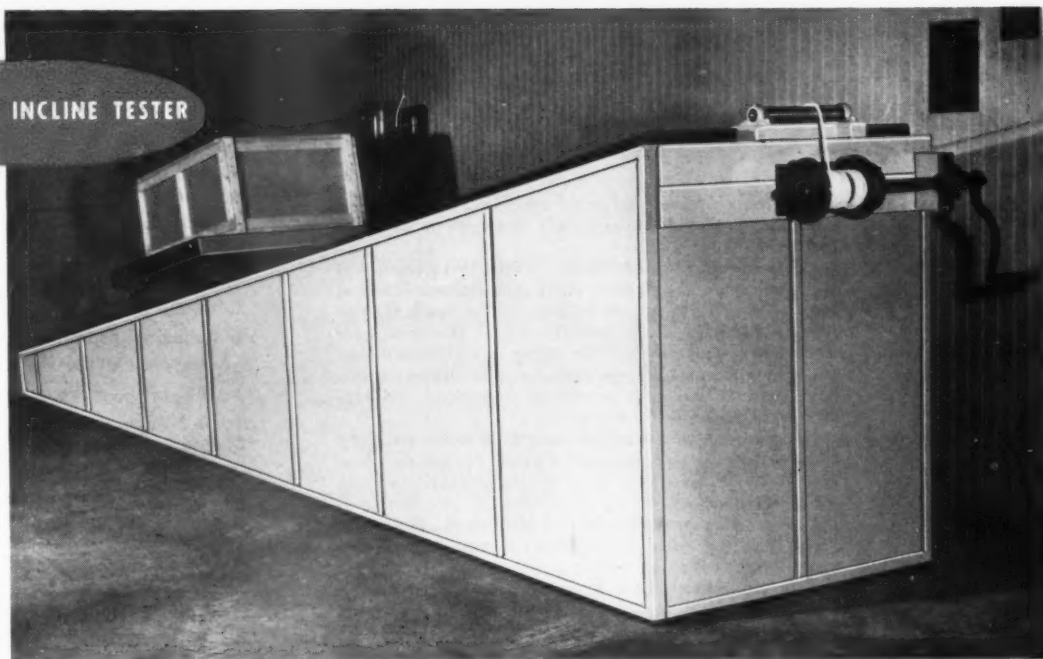
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RAILROAD MEN HEAR STORY OF SAFE TRANSIT PROGRAM

Members of the National Safe Transit Committee were on hand at the Association of American Railroads meeting, October 31, to give a presentation of the National Safe Transit Program.

Principles of the voluntary organization set-up were explained and the aims and activities of the cooperative program for improving packaging and shipping practices and reducing shipping losses were presented.

Scheduled to appear on the program were the following members of the National Safe Transit Committee: Ralph F. Bisbee, general chairman; E. H. Shands, technical chairman; P. W. Bush; W. B. Keefe; and J. K. Linsenmayer.

The program called for Bisbee presenting a general review and progress of the Committee, with Shands explaining the technical planning and carrier view. An explanation of correlation work being done with carriers was scheduled for presentation by P. W. Bush, followed by a comprehensive film and showing of research work done in pre-testing of basic carloading.

(A similar program was presented at the 1951 annual membership meeting of the American Trucking Association's National Freight Claim Council. (See "ATA Shipper-Carrier Receiver Meeting," August issue, page 69.)

Packaging method...

→ from Page ST-5

ped over the upper motorcycle crate brace crosswise and nailed to the crate sides prevents side-shifting.

Shipping container engineers designed three-section "half-mats". Each such "half-mat" thus consists of a crate end and one-half of each crate side.

The export boxes are similarly engineered, except that they are completely closed. Tullgren said that over-all packing costs have been reduced since the conversion.

Solid packaging materials

an elementary discussion of what the packaging engineer should know about some of the widely used packaging materials

by James J. Brennan • U. S. NAVAL SUPPLY RESEARCH AND DEVELOPMENT FACILITY,
NAVAL SUPPLY DEPOT, BAYONNE, NEW JERSEY

THERE are 1,182 distinct species of forest trees in America, and 68 species constitute nearly 100% of wood used for packaging. For convenience and standardization, these 68 species have been divided into four groups. All of the species in each group have similar characteristics and the grouping was made on the basis of nail holding power, strength, and hardness.

Group I woods are principally conifers, and furnish about one-half of the total lumber used for boxes and crates. These woods have low nail-holding power, but will accept large numbers of large nails without splitting; they are soft, dent rather easily, and shred rather than splitting.

Group II woods include the semi-soft woods: Douglas fir, southern yellow pine, etc. This group provides about 28% of the total lumber used for boxes and crates. Of this amount, about 70% comes from southern yellow pines, of which there are several species. The southern yellow pines are among the leading woods used for heavy crating and are also used both as rotary-cut veneer and sawn lumber for boxes. Both southern yellow pine and Douglas fir have extremely dense summer growth rings which tend to split badly with nailing, and nails have a tendency to follow the softer winter rings and may run out at the edges of the board. However, lightweight soft pieces nail almost as easily as some of the *Group I* woods, and the dense bands give a decided advantage in nail holding power.

Group III woods are all broad-leaved hardwoods, and are sometimes known as the semi-hard woods.

The principal species in this group is the gums, which find extensive use as rotary-cut veneers or sawed boards in wirebound boxes. These woods are relatively hard and dense, have good nail holding power, but tend to split rather badly.

Group IV contains the very hard woods: oak, hickory, rock maple, etc. These woods are extremely dense and strong, have excellent nail-holding power and wearing qualities, but are difficult to nail because of their density and splitting tendency. They are used principally where great strength or resistance to abrasion is needed, and may be obtained as either veneers, plywood, or sawn lumber.

Of perhaps even greater importance than the selection of the type of wood, is the selection of the proper grade and degree of seasoning. Lumber should be well seasoned and reasonably free from defects which materially affect the strength of the piece. Lumber is considered to be well seasoned when its moisture content averages between 12 and 18%.

Proper consideration must be given to the job a board is to do. Knots, cross grain, insect holes, and bark all seriously interfere with the strength or utility of a board. However, it is not necessary to buy first or second grade lumber for packaging. Recent studies indicate that considerable savings may be had by purchasing the lower grades and cutting so as to eliminate the defects.

Fastenings for wood

Let us now turn to the fastenings which are used for wooden containers. Of first importance is the *common nail*. The bright nail, as it is

sometimes known, depends solely on the friction between the shank and the wood fibres for its holding power. Unless it is possible to clinch common nails in the container construction, their use should be avoided.

The *cement coated nail* is a bright nail which has been coated with a resin to increase the friction between the shank and the wood. A cement coated nail will make a joint as much as 50% stronger than a bright nail of equal size. Cement coated nails are most effective when used with *Group I* woods, for the harder woods tend to wipe off the coating. Also, the effectiveness of the cement coating diminishes with time after the nails are driven.

Most of the disadvantages of the cement coated nail are lacking in the *chemically etched nail*. This is a nail which has been dipped into a chemical solution which attacks the surface and pits it. Chemically etched nails may be prepared in any box shop with a minimum of time and cost. The etching is permanent, and the nails can be used effectively with wood of any density, or re-used, since the coating will not rub off. . . .

The only other important nail in box-making is the spiral groove or drive screw nail. The withdrawal resistance of this type nail is almost phenomenal, especially in hardwoods. Used extensively in pallet construction, this nail is some 50% better than the next best competitor. A modification of the drive screw nail—the annular ring nail—is somewhat more effective in the softer woods. This nail will enter easily but will resist withdrawal. to Page ST-14 →



Photos show the speaker's table at luncheon held prior to the awarding of the prizes in the Protective Packaging Competition sponsored by the Society of Industrial Packaging and Materials Handling Engineers.



Industrial packaging, materials handling exposition held in Cleveland

6,000 packaging and materials handling men attend exposition, annual protective packaging competition prizes announced

AT the 6th annual Industrial Packaging and Materials Handling Exposition, held in Cleveland, October 1-4, the prize winning awards in the annual Protective Packaging Competition were announced.

Both the Exposition and Competition are sponsored by the Society of Industrial Packaging and Materials Handling Engineers. In addition, there was a Packaging and Materials Handling Short Course, sponsored jointly by SIPMHE and the Case Institute of Technology. The Exposition and all meetings were held in Cleveland's Public Auditorium.

Competition awards

Awards in the Protective Packaging Competition were presented to the best designed and engineered packages submitted by many of the nation's leading packaging engineers.

The list of prize and award winners follow:

Group 1—Corrugated or solid fibre

ST-10

boxes: 1st prize, W. E. Christopher, Douglas Aircraft Co., Inc., Santa Monica, Calif.; 2nd prize, T. E. Richards, Morse Chain Company, Ithaca, N. Y.; 3rd prize, Irwin M. Rehm, RCA Victor Division of Radio Corp. of America.

Honorable mentions in Group 1 included: David A. Williams, Perfection Stove Co., Cleveland; William M. Ward, Pontiac Motor Division of GMC, Pontiac, Mich.; A. A. Langen, Oliver Corporation, Battle Creek, Mich.; R. M. Heckmann, International Harvester Tractor Works, Chicago; Evan M. Shufeld, American Hard Rubber Co., Akron; and Irwin M. Rehm, RCA.

Group 2—Nailed wood boxes and crates: 1st prize, H. H. Lemmerman, Airco Division of Air Reduction Co., Jersey City; 2nd prize, H. J. Kettleborough, Conco Engineering Works, Mendota, Ill.; 3rd prize, Elmer Rarity, J. W. Martin & Sons, Salinas, Calif.

Group 3—Wirebound boxes and crates: 1st prize, Earl Forsberg, Ohio Chemical & Surgical Equipment Co., Madison, Wis.; 2nd prize, Ralph Solomon, Samuel Stamping & Enameling Co., Chattanooga; 3rd prize, R. W. Morey, J. I. Case Co., Bettendorf, Iowa.

Honorable mentions in Group 3 included: Charles B. Denniston, Airtherm Mfg. Co., St. Louis; Frank M. Syre, Federal Enterprises, Inc., Chicago; Glenn Davis, American Machine & Metals, Inc., St. Louis; Ed Kolk, Liquid Carbonic Corp., Chicago; M. C. Downs, American Locomotive Co., Schenectady; R. H. Bakewell, Leland Detroit Mfg. Co., Detroit.

Group 4—Cleated panel boxes: 1st prize, Gale C. Cunningham, North American Aviation, Inc., Los Angeles; 2nd prize, E. R. Heil, Windermere Storage & Moving Co., Inc., Cleveland.

Group 5—General: 1st prize, Wil-

liam M. Ward, Pontiac Motor Division of General Motors, Pontiac, Mich.; 2nd prize, Martin A. Westerland, Peninsular Metal Products Corp., Detroit.

Group 6 — Export packages: 1st prize, C. R. Gustafson, American Radiator & Standard Sanitary Corp.; 2nd prize, Gale C. Cunningham, North American Aviation, Inc., Los Angeles; 3rd prize, Henry H. Kelly, Westinghouse Electric Corp., East Pittsburgh.

Honorable mentions in Group 6 included: Gale C. Cunningham, R. M. Heckmann, International Harvester; and Gordon A. Meyer, Stromberg Carlson Co., Rochester, N. Y.

Group 7—Materials handling: 1st prize, Robert F. Sanford, A & R Lettuce Co., Salinas, Calif.; 2nd prize, S. S. Beekman, International Harvester Co., Springfield, Ohio.

The Harold Jackson Trophy for the best method of cushioning against shock and breakage (with particular reference to exports of radio, television and other electronics) went to Gale C. Cunningham, of North American Aviation.

The Irving J. Stoller award, for the entry incorporating the best interior packing went to W. E. Christopherson, of Douglas Aircraft Co.

Handling washing

machine wringers

In one of the short course sessions, Charles J. Phiscator, packaging engineer, Whirlpool Corporation, St. Joseph, Mich., presented an illustrated talk on "Use of Proper Handling Equipment."

One of the many photos illustrating the talk showed a special pallet for wringer frames that are made in Iowa, and shipped to Whirlpool's plant. "We use from 500 to 1500 of these frames every day," said Phiscator. "They were originally packed one to a carton and piled loose in a truck. It required 12 man-hours to unload 500. With a special pallet, it takes only one man-hour. It also took one man full time to remove the frames from the carton at the assembly line. Now the man on the line unpacks them. Also, it reduced damage from 10% to less than 1/2 of

1%. These special pallets have the feet on the bottom, so constructed that they can be stacked 3-4 high with safety."

Handling crated water heaters

Don Hartquist, plant engineer, A. O. Smith Corporation, Kankakee, Ill., discussed "Handling of Crated Water Heaters with Lift Trucks but without Pallets." His talk was illustrated with photos and a short movie on operations at their Kankakee plant.

"After many studies and investigations trying to find a better handling method (for water heaters)," said Hartquist, "the solution to all our problems in this department resulted from the design and installation of a unique attachment on our standard lift truck. This attachment we call the "Finger Lift." (See "A New Method of Handling Crated Appliances," January 1951 finish, page 75, for a description of this new lift truck attachment.)

"The old method of handling crated water heaters from the assembly lines into storage required two men of a five-man crew. Now one truck driver with no helpers can handle the same number of heaters in 7 1/2 hours that the five-man crew had

difficulty handling in 10 to 12 hours," stated Hartquist.

Mobile cranes in industry

Julien R. Steelman, Koehring Co., Milwaukee, discussed the subject of "Mobile Cranes in Industry."

"First of all, the mobile crane is fundamentally a tool for outdoor operations," said Steelman. "They can be used indoors on occasion, especially if they are equipped with short booms, but most other types of material handling equipment are more effective than the mobile crane in this area.

"The second characteristic of the mobile crane is the high lifting capacity. Even the smallest machines in this classification have lifting capacities in the range of from 5 to 8 tons at a 12-foot radius. Capacities of 15 to 18 tons are general, and for special material handling problems standard machines are available with capacities up to 80 tons. The present limit of rubber-mounted units is in the area of 30 to 35 tons, but there is no reason that this could not be exceeded if the need should develop.

The third characteristic of mobile cranes is their ability to hoist loads to relatively high elevations — 60 to

to Page ST-23 →

SNAPSHOTS FROM SIPMHE →

Shown with the first prize winner in the Export class is Dudley C. Carey, assistant to C. R. Gustafson, chief engineer for containers and materials handling at the Louisville plant of American Radiator & Standard Sanitary Corp., who entered it in the contest.





General Box Company



Atlas Plywood Corporation

SNAPSHOTS FROM INDUSTRIAL PACKAGING



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Wirebound Box Manufacturers Assoc.

WOOD MATERIALS HANDLING EXPOSITION



American Box Company



Rathborne, Hair & Ridgway Box Co.

finishfotos



Gerrard Steel Strapping



National Wooden Box Association

Packaging materials

→ from Page ST-9

Space prevents more than a mere mention of the other wood fasteners: wood screws, corrugated fasteners, lag screws, and bolts. Each has a particular advantage and an important function, but their uses are limited.

Before going into the subject of nailed wood boxes, a few tips on nailing: The weakest part of a wood box is the nailed joint; a little care will

save a lot of waste. There is no substitute for the proper size and number of nails. End grain nailing should be avoided wherever possible. Cross-slant driving of nails in green lumber helps take some of the curse off that material. Pre-bored holes for large nails reduces splitting, increases strength, and makes sure that the nail goes where you want it to go. A blunt pointed nail, while slightly lower in withdrawal resistance, has a much less greater tendency to cause

splitting than a sharp pointed nail.

Wooden shipping containers

One of the most widely used form of wooden shipping container is the nailed wood box. Among the several reasons for this popularity are:

1. The manufacturing technique is very flexible: (a) They can be made on an assembly line with the use of power saws and nailing machines; (b) They can be custom-made by one man with a saw, a hammer, and some nails.
2. They can be made in any size and shape for loads up to 1000 pounds.
3. They have a high degree of rigidity and resistance to puncture.
4. They have a high strength-to-tare weight ratio.
5. They are relatively immune to damage by the elements.
6. They have a considerable re-use or salvage value.
7. They possess good stacking characteristics, retaining their shape and capable of supporting high superimposed loads.

But that is only part of the story, nailed wood boxes like anything else have certain disadvantages:

1. The rigidity of the box means that shocks are transmitted directly to the contents; this requires the use of cushioning when shipping fragile items.
2. Compared with other containers, the nailed wood box is uneconomical in its use of lumber.
3. They are not altogether cheap.
4. The tare weight is high, as is the cubic displacement.

There are seven distinct types of nailed wood boxes made from sawn lumber. These types are known to the manufacturers and the trade as Styles 1, 2, 2½, 3, 4, 5, and 6. The principal differences in the constructions of these boxes lie in the design of the ends.

The Style 1 box is the simplest of all; it consists of ends of a single thickness of lumber with the sides, bottom, and top nailed to the ends. Top and bottom boards are nailed to the side grain of the ends and the side boards are nailed to the end grain.

WEYERHAEUSER CRATES



Bundled for palletized loading

● To simplify handling and reduce storage costs, Weyerhaeuser crates are furnished in sections. From 40 to 50 crate sections can be metal-strapped together and palletized for truck handling. Palletized handling reduces unloading, and storage costs. It also makes the crate sections readily accessible. Weyerhaeuser Crates are also available in one-man bundles.

Weyerhaeuser-designed crates utilize hardwoods and soft hardwoods where each serves best... thereby securing a product of adequate strength

that can be assembled without splitting or costly pre-drilling.

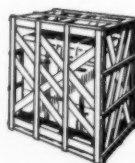
Diagonal bracing gives these crates 65% more strength than ordinary strut crates. Nailing at corners combines secure joining with maximum rigidity. The open design allows inspection of the product in transit without the expense of uncrating.

Weyerhaeuser offers a complete engineering service, backed by 18 years of experience in designing and building sectional crates... for complete information, write or phone.

WEYERHAEUSER SALES COMPANY

INDUSTRIAL WOOD PARTS DEPARTMENT

Room 2133 • 400 West Madison, Chicago, Illinois



In the Styles 2, 2½, and 3 boxes, each end is strengthened with four cleats. The ends are thus reinforced against splitting and the sides are strengthened by the greater holding power of the nails driven into the side grain of the vertical cleats. When Style 2½ boxes are assembled on machines, the shoulders in the vertical side cleats support the horizontal cleats in taking the severe thrust of the nailing machines. On Style 3 boxes, with square ends, all the cleats are of equal length and shape, and so are interchangeable. This is a manufacturing advantage.

The two cleats at each end of the Style 4 box distribute internal forces over the entire face of the box end reducing splitting and breaking of end boards. Nails can be staggered and side grain nailing is possible around the entire end.

The Style 5 box is essentially the same as Style 4 except that the cleats are placed inside the box. While this reduces the length of the box and the overall cube, this is a difficult box to make and the cleats do not protect the ends of the top and bottom boards. The cleats may be either square or rectangular.

The Style 6 box is similar to the Style 1 except that the end and side boards are joined by either keying or dovetailing to provide tight corners which prevent shifting, or to provide a rigid small box.

While the difference in cost between the most expensive—Style 3—and the least expensive—Style 1—is not great, the differences in performances are marked. The Style 1 box is seldom used with loads greater than 60 pounds; Styles 4 and 5 are adequate for loads of 200 pounds or less; Style 6 boxes may be used with loads ranging from a few ounces to 150 pounds; for loads over 200 pounds the Styles 2, 2½, and 3 boxes are usually interchangeable.

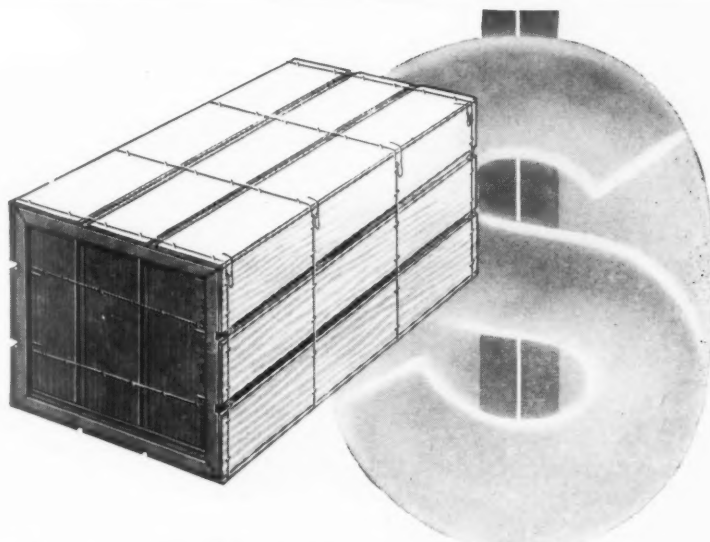
Coopered barrels

Coopered wooden barrels of sawn lumber have been used for at least 2000 years without basic change in their construction. Modern science has been unable to improve this basically strongest of all containers. The

coopered barrel derives its strength from the double arch construction and is available in two main types. *Tight barrels* are used for the shipment or storage of liquids, semi-solids and heavy solids. *Slack barrels* are used with powders, semi-solids and solids. In sizes from one quart to 60 gallons, barrels are made of many types of wood or combinations thereof. They may be bound with steel, wire or wood hoops or combinations of these.

Wirebound containers

Shortages of lumber for packaging during the last war were, in no small degree, responsible for the increased prominence of containers made from veneer, re-sawn lumber, and plywood . . . Basically, the wirebound box is a light-weight container constructed of re-sawn lumber, single thickness veneer, plywood, or solid fibreboard held together by binding wires. Available in almost any size and shape, wirebound boxes are des-



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SUPERSTRONG boxes and crates—designed and constructed for your product alone—have a lower overall cost than just ordinary containers.

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WIREBOUND BOXES and CRATES
WOODEN BOXES and CRATES
CORRUGATED FIBRE BOXES
BEVERAGE CASES
STARCH TRAYS . . . PALLETS

RATHBORNE, HAIR and RIDGWAY BOX CO.
1440 WEST 21st PLACE • CHICAGO 8, ILLINOIS

ignated by the type of wire closure employed:

Style 1. This twisted wire closure has the advantage of cheapness and unlimited take-up. However, the wires have a tendency to break at the twisting point thereby reducing the possibility of re-using the container. Also, the sharp ends are a hazard to handlers.

Style 2. This most commonly seen type of wirebound closure is known as the "Looped wire closure" or "Rock Fastener" and is the fastest and easiest to make. Since the wires are not injured in closing or opening, re-use quite practical.

Style 2A. The Saranac Loop, or twisted wire loop closure is the least common of the various closures because although it is the strongest, it is also the most expensive.

Style 3. This box has the same

closure as the Style 2, but the box is provided with end wires which permits assembling without nailing.

All wirebounds use either mitered or mortised and tenoned cleats interchangeability, but there are 11 basic arrangements of the reinforcing end battens. Each form has specific applications and advantages which are best known to the manufacturer. In general, wirebounds weigh only one-half as much as a nailed wood box of equal size, they are surprisingly strong and flexible, and resist shock well because of the resiliency of the thin wood members and the steel binding wires. They are generally shipped and stored in knockdown fashion which is highly economical of storage space. A knocked-down wirebound is generally referred to as a *shook*. The main economies of wirebounds stem from their efficient use

of wood, their light weight, and the ease and speed of assembly.

While very resistant to bursting, wirebounds are rather easily crushed unless the contents supports the faces from within. In this respect they are not unlike corrugated fibre boxes. They provide no protection against the elements and they themselves are vulnerable to this type of damage. Veneer panels especially are subject to twist, warp, and disintegrate as a result of becoming wet; re-sawn lumber is much less vulnerable to this hazard. Waterproof case liners are a must for material which can be damaged by water, especially if exposure to weather is a possibility . . . During the war, the Navy found that wirebounds could be re-used from 3 to 5 times.

Not limited to boxes alone, wirebound construction has been successfully applied to the construction of crates for heavy equipment. The item is placed on a strong skid or pallet board, and a wrap-around shook supports a cleated, re-sawn top.

Plywood boxes

To attain greater strength with less weight than is possible with nailed, sawn-lumber boxes, eleven distinct styles of plywood boxes have been developed. All of these utilize cross-banded plywood panels with solid lumber cleats. For export shipment, waterproof plywood which has been treated to prevent fungus growth may be used. The Army and Navy have adopted Styles A and B boxes for overseas shipment. Among the advantages listed for plywood boxes are their light weight (only 75% of the weight of an equal size sawn lumber box), their resiliency and resistance to puncture, the substantial protection they offer against dirt and dust, and the fact that they may be stored knocked-down and easily assembled. . . .

Adapted from a section of the "Packaging and Materials Handling Short Course" conducted jointly by the Society of Industrial Packaging and Materials Handling Engineers and the Case Institute of Technology during the 6th annual Industrial Packaging and Materials Handling Exposition, held in Cleveland, Ohio.



Kimpak* Float Packaging



AERO MAYFLOWER TRANSIT CO.

Cuts shipping costs— reduces damage in transit!

How many millions of dollars manufacturing concerns lose each year because of product damage in shipment could never be accurately estimated. But today, any company is able to count its *savings* after a change from outmoded, inferior packaging materials. In countless cases the change has been to KIMPAK* Float Packaging—now recognized as one of the world's most effective packaging methods at lowest true cost.

The effectiveness of KIMPAK protective cushioning is well demonstrated by the Aero Mayflower Transit Company—coast-to-coast movers who have compiled a unique record of damage-free shipments since their adoption of a modern, up-to-date packaging operation. Because Aero Mayflower transports the wide variety of furniture items which are found in the home, their use of KIMPAK indicates the

versatility of this superior cushioning material. KIMPAK is soft, clean, feather-light—as easy to apply as wrapping paper. Available in rolls, sheets or pads, it can be "tailored" to almost any size, shape or density. KIMPAK protects against shock, scratching and press-marking—will absorb up to 16 times its own weight in moisture. No wonder Aero Mayflower can point with pride to such a fine shipping record. And no wonder so many manufacturers are finding a satisfactory answer to their packaging problem—with KIMPAK protective cushioning.

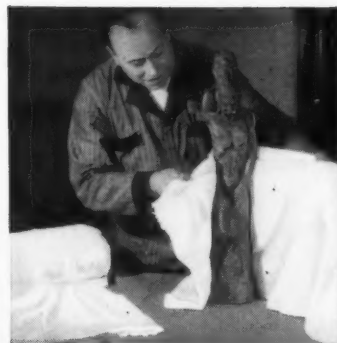
Take a tip from a company that has packed and shipped *your* kind of product under the most difficult conditions—with complete safety. Investigate KIMPAK Float Packaging at your earliest opportunity. For complete information, write to Kimberly-Clark Corp., Neenah, Wis.

Kimpak

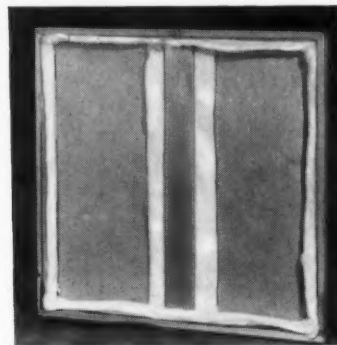
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PROTECTIVE CUSHIONING



Metal Statue is well padded with KIMPAK protective cushioning.



Glass Picture Frame in wood crate with edges cushioned by KIMPAK.



Mahogany Table. Top cushioned with KIMPAK to protect filigree.

— TWO FREE BOOKLETS! —
KIMBERLY-CLARK CORPORATION
Neenah, Wisconsin F-1151

Please send me free, the following illustrated KIMPAK booklets:

- ☐ Float Packaging
- ☐ Military Packaging

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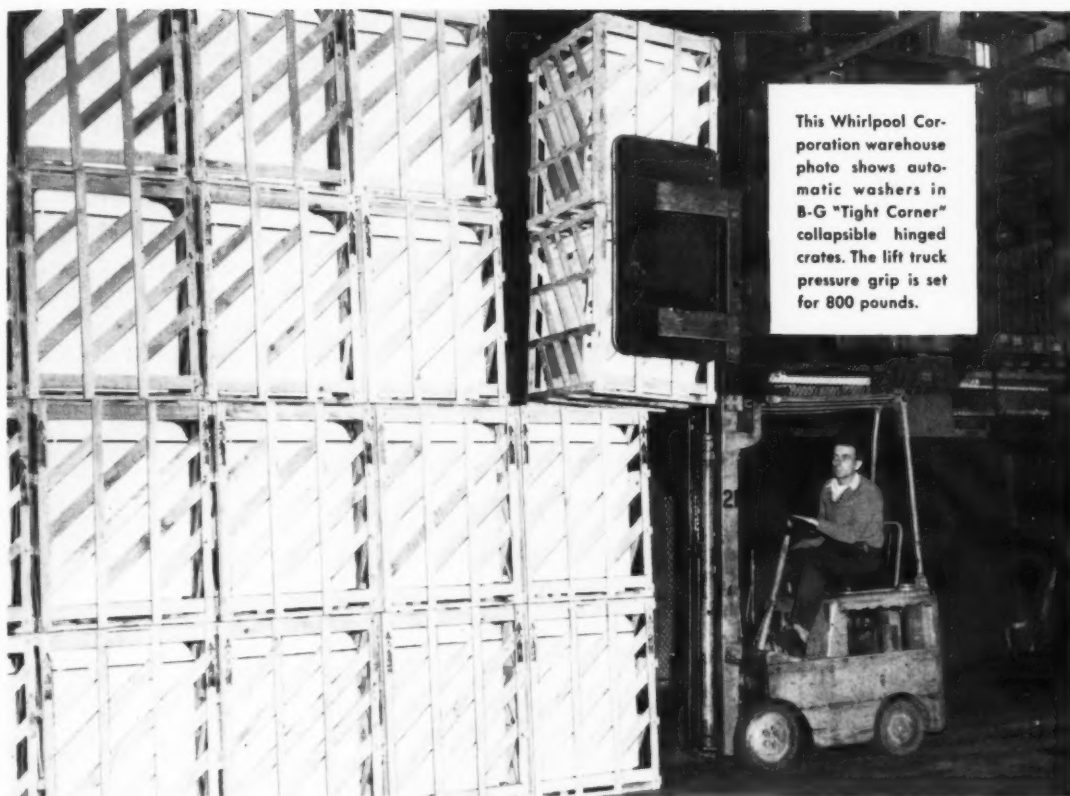
89 companies cooperating in Safe Transit program

THE following companies are certified under the NST Program.

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AllianceWare, Inc.
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American Central Division
Avco Mfg. Corp.
Connersville, Indiana
American Stove Company
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American Stove Company
St. Louis, Missouri
Andes Range & Furnace Corporation
Geneva, New York
Apex Electrical Manufacturing Co.
Cleveland, Ohio
Appliance Manufacturing Company
Alliance, Ohio
Automatic Washer Company
Newton, Iowa
The Bellaire Enamel Company
Bellaire, Ohio
Belmont Stamping & Enameling Co.
New Philadelphia, Ohio
Bendix Home Appliances
Division—Avco Mfg. Corp.
South Bend, Indiana
Boston Stove Foundry Company
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Caloric Stove Corporation
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Central Rubber & Steel Corporation
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Conlon-Moore Corporation
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Continental Water Heater Co.
Los Angeles, Calif.
Cribben and Sexton Company
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Crosley Division, Avco Mfg. Corp.
Richmond, Indiana
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Crunden Martin Manufacturing Co.
St. Louis, Missouri
Day & Night Division
Affiliated Gas Equipment, Inc.
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Motor Products Corporation
North Chicago, Illinois
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Dixie Foundry Company, Inc.
Cleveland, Tennessee
Duo-Therm Division
Motor Wheel Corporation
Lansing, Michigan
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Cleveland, Ohio
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Florence Stove Company
Kankakee, Illinois
The Floyd-Wells Company
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International Harvester Company
Evansville, Indiana
Kaiser Metal Products, Inc.
Bristol, Pennsylvania
Kresky Manufacturing Co., Inc.
Petaluma, California
Kuehne Manufacturing Co.
Mattoon, Illinois
Landers, Frary & Clark
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Milwaukee, Wisconsin
Lisk-Savory Corporation
Buffalo, New York
Majestic Manufacturing Co.
St. Louis, Missouri
Malleable Iron Range Company
Beaver Dam, Wisconsin
The Maytag Company
Newton, Iowa
Meadows Division, Thor Corporation
Bloomington, Illinois
Midwest Manufacturing Company
Division of Admiral Corp.
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Moffats, Limited
Weston, Ontario, Canada
The Moore Enameling & Mfg. Co.
West Lafayette, Ohio
Mt. Vernon Furnace & Mfg. Co.
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Scranton, Pennsylvania
Murray Manufacturing Company
Murray, Kentucky
Nash-Kelvinator Corporation
Grand Rapids, Mich.
Nesco, Inc.
Milwaukee, Wisconsin
Newark Stove Company
Newark, Ohio
Norge Division, Borg-Warner Corp.
Effingham, Illinois
Norge Division, Borg-Warner Corp.
Herrin, Illinois
Norge Division, Borg-Warner Corp.
Muskegon Heights, Michigan
Odin Stove Manufacturing Co.
Erie, Pennsylvania
Payne Furnace Division
Affiliated Gas Equipment, Inc.
Monrovia, California
Perfection Stove Company
Cleveland, Ohio
Philco Corp., Refrigerator Division
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Prentiss-Wabers Products Co.
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Ranney Refrigerator Company
Greenville, Michigan
Republic Stamping & Enameling Co.
Canton, Ohio
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Westinghouse Electric Corporation
Mansfield, Ohio
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York Corporation
York, Pennsylvania



This Whirlpool Corporation warehouse photo shows automatic washers in B-G "Tight Corner" collapsible hinged crates. The lift truck pressure grip is set for 800 pounds.

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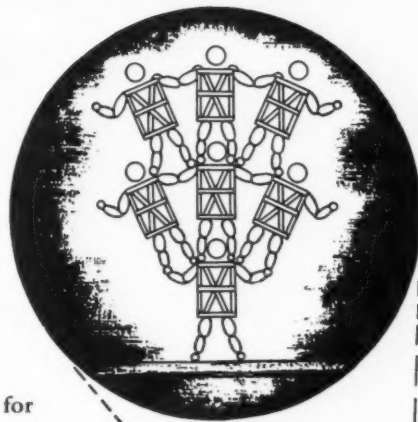
CRATE STRENGTH

for STACKING ... for HANDLING

B-G "Tight Corner" collapsible hinged crates have built-in strength for stacking—and—strength to withstand all normal handling and transit hazards. They are engineered to carry *your* particular product safely.

The "Tight Corner" hinged crate is a time-saver too—it comes to you 65% assembled. Just nail top and bottom in position, using factory pre-drilled nail holes.

We will help you find the right answer to your shipping problems for civilian goods or for defense. Write us now and let us show you how to save money and reduce shipping losses.



Manufacturers of washing machines, ranges and all types of home appliances are turning to the "Tight Corner" collapsible crate for assurance of safe delivery of their finished products.



Kraft
Crate



Tight Corner
Hinge Crate



Pallets



Pallet
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Wooden
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Six Section
Panel Crates

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ATLAS PLYWOOD CORPORATION ACQUIRES PLYWOOD, INC.

Atlas Plywood Corporation, Boston, has announced the acquisition of control of Plywood, Inc., Detroit, through purchase of stock, most of which came from a group of majority stockholders.

Elmore I. MacPhie, president, stated that the purpose of the purchase was to provide a steady flow of Atlas hardwood panels and flush doors through the 16 warehouses now operated by Plywood, Inc. in the area from Cleveland-West.

MacPhie stated "These warehouses plus their four West Coast fir mills and two Michigan hardwood mills give us increased distribution for the output of the 50 manufacturing and distributing plants we previously had, and establish a reliable and continuous outlet for both Plywood, Inc. and Atlas Plywood Corporation.

"Frank W. Harney, vice president, Atlas Panel and Door Division, will also serve as executive manager of Plywood, Inc., representing Atlas' interests in Plywood, Inc.

"These 22 new outlets increase our ability to take care of our customers

on a complete line . . . including container grade plywood, plywood packing cases and lumber . . ."

CAMPBELL SUCCEEDS

LAPIDUS AS SIPMHE PHILADELPHIA PRES.

Herbert M. Lapidus, president of the Philadelphia Division of the Society of Industrial Packaging and Materials Handling Engineers, has been transferred to a new position with the Navy in Washington, D. C. For the remainder of the year, the position of president of the Division will be filled by the present executive vice president, F. Robert Campbell, of Armstrong Cork Co. The announcement was made at the first regular fall meeting of the Division, held September 24.

Following the dinner, the Division was treated with very interesting slides of packing designed by General Electric, and shown by Paul Vogt, who has charge of packaging for GE's Apparatus Division. Vogt is also a vice chairman of SIPMHE.

The speaker prefaced his remarks by sketching how the Society grew from the actions of seven men in Chicago some six years ago. He then explained the vital importance of packaging and packing in GE's operations (close to 10 millions having been spent by the company nationwide in one year for fiberboard alone), and how vital savings in losses through damaged shipments were being effected by streamlined methods. The details shown gave the gathering an excellent picture of how big industry makes inter-plant shipments of vital parts of both rugged and fragile nature.

ACME STEEL SALES APPTS.

Two key changes in the sales staff of Acme Steel Company have been announced by W. S. Huss, southern area sales manager.

William G. Polley, southern area special representative, has been appointed district sales manager at Atlanta. Succeeding to Polley's previous position is Charles R. Lammers, transferred from Buffalo.

Needing elbow room in their plant—the Norge Division, at Chattanooga, discovered that its fork trucks could be used to lift material above office enclosures within an existing building. The truck lifts the material for storage up on the enclosure roof while a worker on the roof arranges it. The cartoned material is light enough to be handled easily without trucks for this job. It was reported that so much floor space was freed for productive work by the unusual storage area that Norge saved itself the expense of a new warehouse that it had planned to build.



Shelvador[®] goes overseas with pillowpak^{*}

TRADE MARK



Here is Crosley's 1952 *export* package "Pillowpaked" for complete protection of surface and body against the buffets and blows incidental to a long sea voyage.

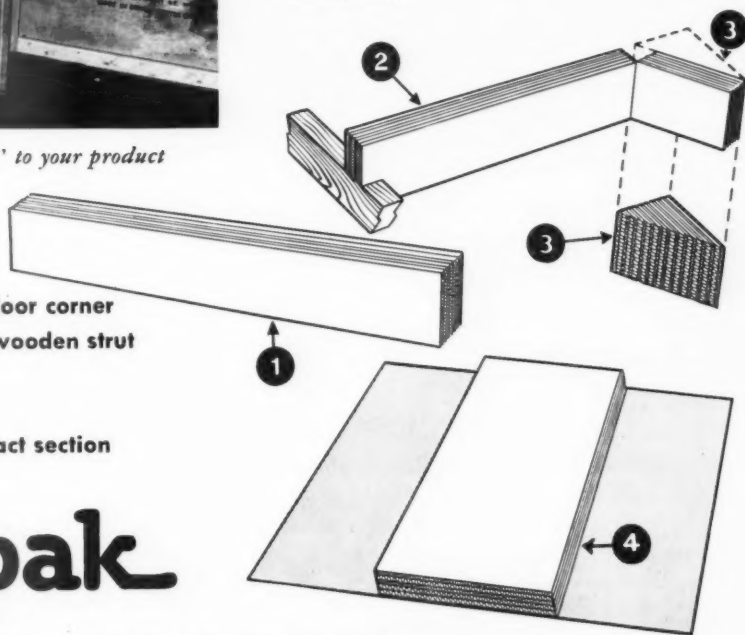
The integral parts designed in conjunction with the Crosley Packaging Engineers are sawed, mortised or hinged with the cleanliness and precision of wood or metal and all surfaces that touch the enamel are as soft as a pillow.

"pillowpak handles your product with kid gloves"

The thick outer corrugated pad absorbs all shocks, the inner Kimpak[†] facing protects the surface and—it's all in one solidly laminated unit.

Pillowpak can also be "tailor-made" to your product

- ① Cross front pad 3 3/4" thick
- ② Side pad hinged to encircle door corner and mortised to rest on rear wooden strut
- ③ Mitered corner pad brace
- ④ Top pad with Pillowpak contact section



*** pillowpak**
TRADE MARK

^{*}Non-abrasive interior packing

[†]Trade Mark Reg. U.S. Pat. Off.

MENASHA WOODEN WARE CORPORATION
Menasha, Wisconsin • Founded 1849

Manufacturers of Corrugated Containers and Interior Packing Specialties

Substitution—and the packaging engineer

by Wilmer J. Balster • THE DON L. QUINN COMPANY, CHICAGO

WHEN I first joined the Don L. Quinn organization some 20 years ago the substitute shipping containers were then being established for any number of commodities too numerous to detail.

Our tests were usually a so-called substitute versus the established shipping container, such as the wood box versus solid fibre then solid fibre versus corrugated. In the heavier items, it was the solid wood box or crate versus the steel banded crate and from that to cleated solid fibre, wirebounds and the present day corrugated packs. Each of the mentioned types of shipping containers eventually became established within its own field.

The laminated pressure sensitive type of tape is now in use in industry. In many instances this method of closing is used in place of steel or wire banding. Preliminary tests have been conducted on a banding product consisting of longitudinal fixed lengths of string in $\frac{1}{2}$ " width which is intended to augment metal or pressure sensitive banding. The closure is effected without tools with a clasp which securely locks the band in position. The product no doubt has many methods of application which have not been developed or established.

We also have the very successful glued manufacturer's joint which I imagine will soon be more widespread in the industry.

We recently conducted tests on a method of box closure which uses 2 sheets of Kraft paper fixed together with spots of adhesive. The fixed sheets are applied in the usual manner. When the flaps of the box are pulled the separation occurs at

the spotted area permitting reuse of the container by the application of new sheets where reuse is intended.

There are adhesives on the market which have also been developed for the reuse of shipping containers.

Many readers no doubt are familiar with the plastic coating and spray application in multiple wall bags, drums, and barrel liners. This is a highly efficient application used with a great deal of success. One recently published article discussed a blown polyethylene bottle to use as a substitute for the glass carboy. This product is evidently an enlargement of the small plastic type containers in use so successfully in the cosmetic and like fields. I would like to add a word of caution. When considering a substitute, the carrier regulations applying to that particular product should be checked.

Laboratory experience

If past experience is any criterion the most widespread substitution is in the application of materials now in use. Believe me that should give everyone interested in good packaging something to worry about. The following has actually happened.

It has been our experience in the laboratory that a person responsible for packaging a product comes in with specific instructions to cut packaging by 10% . . . The production and engineering department has also received its instructions to cut, so they have cut the number of lugs, bolts, struts and thickness of material used to where they place a "handle with care" sign on the product while on its way through the plant. Anything to have it arrive at the packing room in one piece.

This sets into action a chain of events which I imagine many of you know too well. We will skip several stages to get to the boxmaker and the sample room.

The lads in the sample room have already cut costs to please a salesman who in a spirit of good fellowship has over-emphasized the quality of his particular product at a cost lower than his nearest competitor. So what hair is left on heads is pulled out in an attempt to develop a pack which will give some semblance of protection on the way to the consumer. The spur is then leveled at the production staff in the box plant again affecting the quality of the finished product. So with all our grief we finally have a packed product which performs quite well in the laboratory tests even with the substitution of outer container, interior packaging details and a shaved down product.

The next morning in the obituary column is a notice of the death by suicide of the packaging engineer. The pack was of such dimensions that they could not stow it in the box car and meet the minimum loading requirements. Another blow was the proposal to limit parcel post to 70 united inches and 40 pound gross load.

The point I would like to make is that substitution in any way, shape or form will of necessity be carried out by the packaging personnel responsible for the safe delivery of the product. They will always find ways and means to do that efficiently.

Adapted from a section of the "Packaging and Materials Handling Short Course" conducted during the recent 6th annual Industrial Packaging and Materials Handling Exposition, held in Cleveland, Ohio.

Industrial packaging, materials handling exposition

(Continued from Page ST-11)

70 above the machine itself, and to operate at any radius within a circle that is set up by the length of the boom on the machine.

"For example, a 15-ton crane with a 55-foot boom can cover an area 50 feet on each side of the machine, lift material from one side of this area to another, and load it on trucks or cars," stated the speaker.

Parts palletization program

Paul Flanders, research staff engineer, Manufacturing Research Department, International Harvester Company, Chicago, discussed a special materials handling parts palletization program being used at the company's Canton (Ohio) Works.

"In the past," said Flanders, "Canton Works utilized a system of storage bins and manual handling for warehousing and shipping of service parts. With the institution of a parts depot system by our Company, it became obvious that improvement in our method of handling these items was essential. These parts depots will receive, store and fill orders from depot pallets. In addition, orders from depots are being placed on Works in much larger quantities than heretofore. We recognized the fact that high volume items could be palletized at the factory's point of departmental receipt. With this thought in mind, our parts items were analyzed. This survey revealed that 187 of approximately 22,000 items comprised 55.5% of our total volume. A handling method to fit our particular need was adopted.

"This parts palletization program permits us to handle more items in less time, with less manpower, on less floor space, and allows faster turn-over of freight cars. These factors have permitted us to attain the lowest parts handling cost in Canton Works' history."

Flanders then listed the following benefits from the program:

1. Reduction of handling costs — handling same total volume with 35% reduction in manpower.
2. Reduction in storage space — storing same volume in 15% less space.
3. Product protection improvement —

completely eliminated damage to cast iron plow shares.

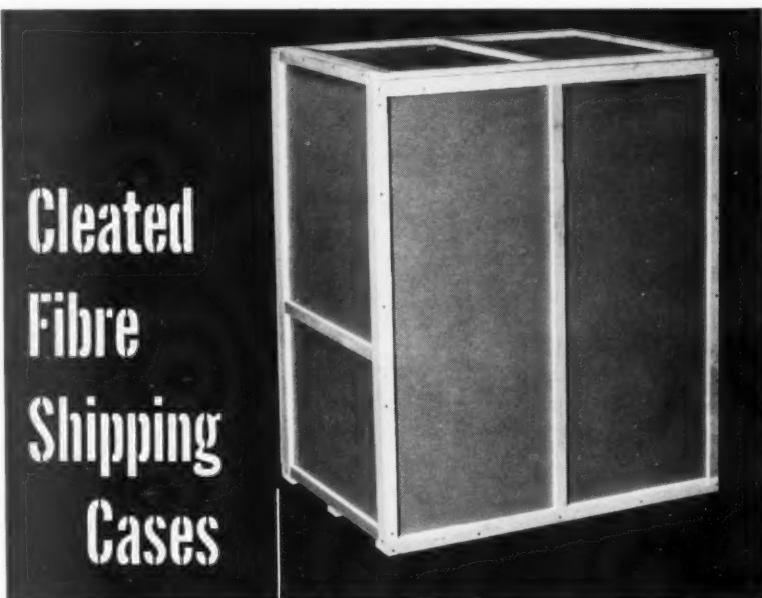
4. Handling hazards reduced — palletization eliminated physical contact by worker with products.

5. Working conditions improved — eliminated strenuous manual labor of pushing wagons through storage, disbursal and shipping.

6. Better service to customers — products can be shipped immediately upon receipt of order since product is already packed awaiting shipment. Carloading efficiencies have increased also.

7. Facility of inventory control — through uniform quantity per box palletization, and smaller, more compact location, physical inventory of shares was accomplished in 30 minutes — an operation which formerly required 160-man hours.

There were many other short course subjects, all dealing with various aspects of packing and materials handling. One course was on "What the Packaging Engineer Should Know about Solid Packaging Materials" (see page ST-9). Another was on "Substitution" (see page ST-22).



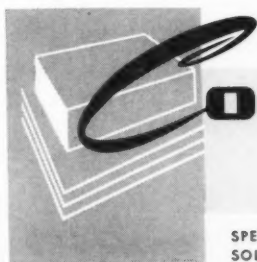
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Commercial
Shipments

FOR
Government
Shipments

are safe, dirt-proof, strong — light in weight — comply fully with railroad and government requirements — present a clean, attractive exterior that lends itself well to advertising your product.

Cornell Cleated Fibre Cases are made at our Milwaukee Plant in many styles and sizes. We invite your inquiries for Cleated Corrugated or Cleated Solid Fibre Cases.

They comply with Government Specifications Jan-P-103 and NN-B-591.

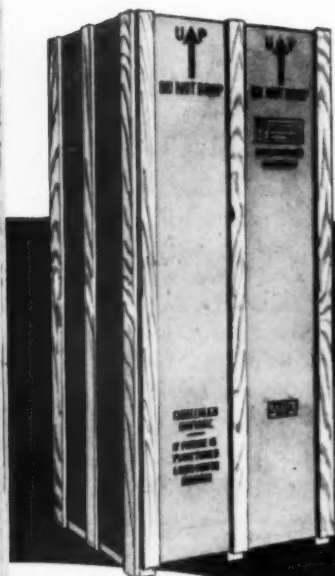


CORNELL

PAPERBOARD PRODUCTS CO.

MILWAUKEE 1, WISCONSIN

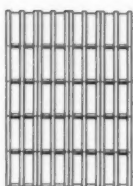
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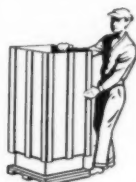
WATKINS

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Containers



◀ **STACKING** Vertical wood cleats provide exceptional supporting strength to carry heavy loads. Typical crate supports 4 tons.

▶ **QUICK** Assembly line packing is speeded up. Easy to handle. Complete protection for your product.



◀ **STRONG** All wood cleats securely glued to tube-mat. Laboratory tests prove glued cleats resist weave and distortion better.

▶ **STORING** Containers are delivered flat (only 3 sections) and closely nested to conserve storage space.



WATKINS...

is the name to remember when choosing your product shipping containers. A Watkins Container provides complete protection. It is scientifically designed to give greater strength with less unit weight.

Your product will arrive at destination **SAFE** and **CLEAN**. It will carry safely, you can stack to any practical height, and resistance to "weaving" and shock is assured. No dust or dirt can reach your product and the smooth, staple-free interior protects fine product finishes.

Assembly time is reduced to a minimum. The 75% assembled containers save labor... save time... save expense.

The "Traveling Billboard" feature of Watkins Containers is an advertising feature to consider. Your advertising message can be printed in two colors on all four sides. Ship and advertise the "Watkins way".

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**WATKINS
CONTAINER**
MADE NEAR YOU

These companies build WATKINS containers

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COZIER CONTAINER CORP.	446 East 131st Street, Cleveland, Ohio
CRATE-RITE MFG. CORP., Division of Pacific Ports Ind. Inc.	10901 Russel Street, Oakland, California
DURA-CRATES, INC.	940 East Michigan Street, Indianapolis, Indiana
GENERAL BOX CO., 500 N. Dearborn St., Chicago, Illinois, and 16th and Maple Sts., Louisville, Kentucky	
HEMB & MARTIN MFG. CO.	Watseka, Illinois
ILLINOIS BOX & CRATE CO.	811 Center Street, Plainfield, Illinois
KIECKHEFER BOX & LUMBER CO.	1715 West Canal Street, Milwaukee, Wisconsin
LANE CONTAINER CORP.	10212 Denton Road, Dallas, Texas
LEWISBURG CONTAINER CO.	243 Singer Street, Lewisburg, Ohio
LOVE MFG., INC.	608 South Commerce Street, Wichita, Kansas

—an inquiry to any of these companies will get prompt attention—



The • WATKINS CONTAINER • Manufacturers



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You can obtain a wealth of practical, useful and authoritative information by discussing your technical problems with a TAM sales engineer. He is well equipped to work for and with you. More than ten years ago he received his degree in Ceramic Engineering from one of our leading universities. Since then, his education has been broadened by wide experience. In the field, he has had his coat off and his hand-in on more than a few plant projects. His advance informa-

tion on new developments and applications is a valuable asset.

Here is a man ready to work with you. You will find him intelligent and cooperative—quick to understand your problems. Furthermore, he is your direct contact with a fully equipped and staffed headquarters that is the source of much worthwhile information and data. When your TAM engineer calls, get the full value that his background offers you.



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NATIONAL LEAD COMPANY

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finish SUGGESTION BOX



Automatic low pressure spraying of washing machine tubs

ABOUT a year and a half ago a low pressure spraying program was introduced into the operations at Ingersoll Products Division, Borg-Warner Corporation, Chicago, Illinois, for the enameling of washing machine tubs. Reports after many months of operation indicate good production, reduction of overspray, and other improvements in operation.

Following the use of the low pressure system with hand spray, an auto-

matic spray machine was adapted to the standard revolving bench-type conveyor. This automatic machine, the first of its type to be installed, employs a standard spray gun. The following is a performance data report based on the combined use of automatic equipment and the low pressure spraying system.

Performance data report

Automatic spray machine adapted

to regular conveyor chain using standard automatic gun.

Ingersoll Products — 1000 120th Street — Chicago.

Charles A. Fleming — Ceramic Engineer.

Fabricate and porcelain enamel finish washing machine tubs.

This unit automatically operates two guns and applies uniform coating of enamel to exterior of the tub. In material savings alone the unit paid itself out in one operating week — 24 hour day.

Does work of two operators.

Obtains same production spraying 600 lbs. less enamel (frit equivalent) in 3 hour shift.

Normal overspray 20% hand operator

Machine overspray 10%

Longer nozzle life

Results more uniform — less rejects as result.

Trailing the editor

→ from Page 16

wearing dark glasses, eating baby food and soup, and daring anyone to say he wouldn't keep his schedule of meetings for October—oh brother, what a schedule!

I'll have to leave the trail here after having a taste of the fun and my fill of the gruesome, for everyone on the pen and pencil end of the work at *finish* must fan out to cover a group of meetings scheduled for the next four weeks that would please us better if scattered over four months.

By the time this little report is in published form, our editorial staff will have covered most of the following group meetings: PMI, Chicago — SIPMHE, Cleveland — PEI, Columbus — NMC, Detroit — AGA, St. Louis — NPVLA, Atlantic City — PPC, Atlantic City — ACS, Los Angeles — AAR, Buffalo — NHLCC, New York — PEI, White Sulphur Springs.

If any reader wants my job of trailing an Editor-Publisher after November 1, I'll gladly trade it to him for a ticket on any plane to Hot Springs, White Sulphur, Florida, California or any similar spot where I can take my shoes off and rest — I'm t-i-r-e-d.





"I see what
you mean by
50 YEARS
YOUNG"

"*You* Ing-Rich people say you're fifty years
young this year.

"That stopped me until I read on, and realized that
what you really mean is that you haven't quit learning.

You've kept young because you haven't turned your backs on new ideas.

"Well, that figures. Look at me; *I'm* fifty. I think I know my business pretty well, but if I
ever start thinking I know *all* about it I won't *have* any business.

"One thing I have learned, though, is to forget my frit worries and trust *plant-tested*
PORCELFRICT. That plant testing feature is one big reason; I know that in addition to rigid
laboratory control, PORCELFRICT has been tried under actual use before I get it. The
other? Why, FIFTY YEARS YOUNG, of course. Neither men nor corporations get too old
to learn. Keep on trying to improve PORCELFRICT, and
you'll keep me as a steady customer."



INGRAM-RICHARDSON, INC.

OFFICES, LABORATORY AND PLANT
FRANKFORT, INDIANA

Ceramic coatings for the "hot spots"

(Continued from Page 34)

Under such circumstances, there is need for a high heat resistant but non-strategic alloy to start with. The ceramic coated headers used in the Boeing 377 are built by Ryan of 19-9DL steel, an alloy containing nickel, chromium, tantalum, titanium, tungsten, columbium and molybdenum, a substantial improvement over the thick ceramic coated low

carbon steel SAE 1020 used in World War II.

The enamel used on this alloy is based on National Bureau of Standards ceramic coating A417, designed for jet engine, gas turbine and other high temperature applications. Specific purposes of the enamel, to prevent oxidation, carbon absorption and corrosion attack have been borne

out in the 650-hour and 1200-hour tests under actual service operating conditions.

Carbon absorption prevented

At the considerably higher operating temperatures of present exhaust systems, much of the rapid deterioration of unprotected headers has been due to high rates of carbon absorption with resulting surface embrittlement. Enameling prevented this carbon absorption, thus greatly increasing the life of the headers.

There was no reduction in gauge thickness (.045") on the header coated on both sides, indicating that the ceramic coating retarded corrosion 100 percent, at least over a 1234-hour period. After 650 hours, only a slight reduction (to .042"), due to scaling on the outside, was noted on the header which was coated only on the inside. Non-coated headers showed some loss in dimensional thickness when used 650 hours.

After fabrication and inspection headers now in production for the Boeing 377 are shipped to the California Metal Enameling Co., Los Angeles, for the ceramic coating process. All parts are sandblasted to provide a uniform finish. Care is taken to assure that the surfaces are free of all contamination so that the ceramic coating will have a maximum bond with the metal.

Slip joints between the header sections are made of alloys with an extremely high oxidation resistance. They must be kept free from ceramic coating where the parts are slipped together. A clay solution is applied by brush to mask these portions. Having no bond with the steel during the firing process, the clay conveniently shatters itself off when the parts cool. The areas coated before dipping are left free for joining purposes.

After any necessary masking, the headers are hung on a conveyor which takes them to the dipper who dips the parts in the special ceramic coating A417 slip.

In making the slip, California Enameling uses a special "frit 331", based on a Bureau of Standards formula.

to Page 106 →

as simple as **A·B·C**



These components for the completely enclosed pipe-line type FerroFilter shows its simplicity of design. Simplified design, careful workmanship, and the finest materials are combined in an extremely effective electromagnetic separator that will give you long, trouble-free service.

To get the clean sparkling enamel finishes you want for your finished product, you *must* have clean, iron free enamel slips. Thousands of feet of magnetized edges of the FerroFilter grids form a protective wall against iron contamination.

The pipe-line FerroFilter will fit into your dip tank circulating system, and your mill unloading or liquid transfer systems to give you the protection you need. Gravity type FerroFilters are available for general use where a closed system is not required.

No modern enameling plant can afford to operate without adequate FerroFilter protection. They represent the lowest cost finish insurance you can buy.

For detailed information send for bulletin #54

Authorized Representatives for the Enameling Industry

Chicago Vitreous Enamel Product Co., 1425 So. 55th Court, Cicero 50, Ill.

Ferro Enamel Corporation, 4150 East 56th Street, Cleveland 5, Ohio

S. G. FRANTZ CO., Inc.

Dept. F P.O. Box 1138

Trenton 6, New Jersey



**It's what is
UNDER the cover
that counts**

"DON'T JUDGE a book by its cover" can logically be paraphrased to read "Don't judge a finish by its surface appearance." Century cover coats have surface appearance and durability, but any porcelain enamel finish must have the right ground coat to insure lasting durability.

"Start right from the steel out" is more than a slogan — it represents a policy and belief at Century that without a good, easy-working, trouble-free ground coat with good adherence or "Grip" no finish can give trouble-free service for the life of the product.

Check with any user of Century ground coat enamel and you will find them en-

thusiastic. The millions of pounds of Century ground coat frit that are used every year by our customers give extra assurance of trouble-free finishes, both in the shop and on the finished product.

If you haven't tried this economical, trouble-free enamel, contact us and we'll see that you have the opportunity.



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• 6641-61 S. Narragansett Ave., Chicago 38, Ill. •

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CLIFF BATES — 360 N. MICHIGAN AVE., CHICAGO 1, ILL.

"I saw your ad in finish"

After the dipping process, the slip is drained from the headers, leaving an extremely thin coating, of approximately .0015" thickness on both interior and exterior. The parts then are beaded to remove any build-up of ceramic coating along the downward edge.

Firing — 12 minutes at 1850° F.

Another conveyor carries the headers to firing in a special high-temperature V-bottom furnace, 12 feet long, 5 feet wide and 4 feet high. The parts are hung from heavy Inconel hooks and frames, and fired for approximately 12 minutes at 1850°F. accurately controlled as to heat and time.

When the parts are removed from the furnace and allowed to cool at room temperature, the clay masking shatters from the coated slip joint and flange surfaces. The other portions have a smooth, green enameled surface.

The nominally higher cost of ceramic coated headers will be more than absorbed by extending the life of the exhaust system, it is reasonable to believe from the results of the tests to date.

Much research is being conducted by industry, technical schools and by the Air Force on use of ceramic materials for various applications. In addition to exhaust systems, these include combustion chamber liners, rotor buckets and stator blades for gas turbines; rocket motor components; walls of ramjet and pulse-jet engines, heat exchangers, and coatings for skins of supersonic vehicles.

At Ryan the key men in Operation Ceramics are Foushee, Hacker, Ralph Haver, manifold design specialist, and the writer.

Additional study is inevitable before even the partial potentialities of ceramic materials are realized. Meantime, this centuries-old art is being put to practical use on such projects as exhaust collector systems for the Boeing 377 Stratocruiser, and on future exhaust systems for Boeing B-50 bombers and C-97 military transports.

Finish will keep you posted on high temperature ceramic coatings.

13th annual PEI shop practices forum

(Continued from Page 50)

Resistance and Industrial Applications was presented by W. A. Deringer, A. O. Smith Corporation.

D. G. Moore, National Bureau of Standards, brought the Forum up to date on *Processing Operations in High Temperature Coatings*. He stressed the importance of tensile strength of steel where excessive temperatures are encountered.

When used in exhaust collector systems for aircraft, ceramic coated stainless steel (1) retards corrosion from exhaust gases, (2) reduces carbon absorption, and (3) reduces corrosion from lead compounds.

The application technique for No. A-417 high temperature coating, developed since earlier coatings, described in *finish* and other publications, were introduced.

Extremely fine grinding, thin spray application (1 to 2 mils fired thickness), drying on a rotating ring, and firing at 1850° F. were included in the recommendations.

W. N. Harrison of the Bureau presented a note of warning. Architectural porcelain enamel and enameled hot water tanks were both retarded in their expansion by some companies entering the fields "without adequate preparation". "If the situation (relating to high temperature coatings) is properly handled", he said, "industry has the opportunity to open up a wide field."

There was keen interest in a description and demonstration of "TI-LOC", a new one coat porcelain enamel finish for steel as developed by Strong Manufacturing Company, Sebring, Ohio. Paul Cecil of the Strong organization described and demonstrated the material in his presentation, *One Coat Application on Non-Premium Steel*. (See Page 36 this issue.)

C. R. Sigler, The Kawneer Company, traced the history of *Enameling of Aluminum* as applied to the building field. He gave complete application information.

(All important early data on this subject has been published by *finish*

and this and later information will appear in later issues.)

Board of experts

As is customary at the Forum, Friday afternoon was devoted to questions, with answers by members of a previously-selected board of experts.

The board consisted of: J. J. Baker, International Harvester Company; R. D. Beck, Binks Manufac-

turing Company; Mel Combs, Vitreous Steel Products Company; Paul Cecil, Strong Manufacturing Company; M. B. Gibbs, Inland Steel Corporation; D. R. Goetchius, Ferro Corporation; G. B. Hughes, General Electric Company; M. E. McHardy, Hussman Refrigerator Company; G. D. Martin, Pemco Corporation; E. C. Ploetz, A. O. Smith Corporation; J. M. Zander, Chicago Vitreous Enamel Product Company.

Big game hunting at forum banquet
to next page →

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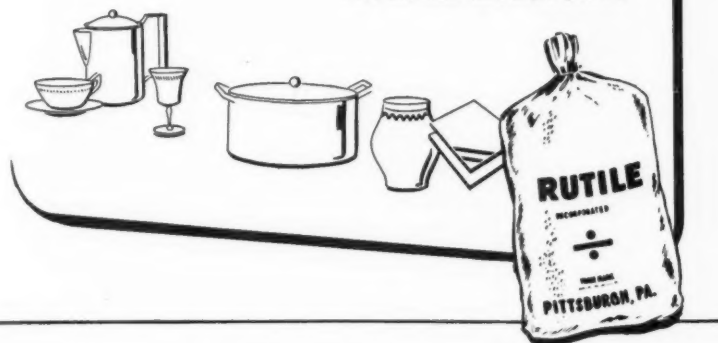
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- "Orwash" Sagger Wash and Refractory Coatings

CALL OREFRACTION ENGINEERS

They welcome the opportunity of working with you in your applications which use Rutile and Zircon. Write us your problems.



7426 Thomas Street, Pittsburgh 8, Pa.

At the Forum Banquet Thursday evening Prof. A. I. Andrews, U. of I., outlined a serious situation relating to the diminishing supply of technical men for the enameling industry. At the University of Illinois, a leading ceramic school, there are only fifteen seniors in the entire ceramic section—to be divided among all

sections of the ceramic industry. At present there are only thirteen juniors, six sophomores and six freshmen.

R. A. Dadisman, Armco Steel Corporation, PEI president, was the featured speaker at the banquet. His subject, "Big Game Hunting," is reported separately.

\$1.7 MILLION COOLERATOR

EXPANSION

Gen. William H. Harrison, president, International Telephone and Telegraph Corp., recently told distributors and dealers of The Coolerator Company, IT&T's newest associate, that IT&T's acquisition of Coolerator means:

1. An allocation of \$1,750,000 for remodeling, expansion, and complete modernization of Coolerator manufacturing facilities.

2. A new and improved line of refrigerators, home freezers, and electric ranges to be ready for 1952.

3. Strong support for dealers through national advertising, sales promotion, and merchandising programs.

4. Strengthening and expansion of the distributor and dealer organization.

Harrison said IT&T had purchased Coolerator because "IT&T is in process of expanding its domestic activity. We have long searched for a suitable opportunity in the refrigeration industry. We found just what we wanted in Coolerator."

AMERICA'S STEEL

'APPETITE' GROWING

America's "appetite" for steel is increasing continually, Leslie B. Worthington, president of United States Steel Supply company, told members of the Sales Executives' Club in Cleveland recently.

Worthington said, "In 1940 the annual per capita consumption of

finished steel in this country was 696 pounds. Currently it is about 1034 pounds. It is estimated that in 1953 production will make available for consumption approximately 1106 pounds per capita—an amount far exceeding that which we have ever known before."

He predicted that in spite of the present market condition the time would come when steel salesmen will have to "get out in the street and peddle their products," and stated that his company was now training salesmen against that day.

BURIED SCRAP REMOVAL

AT NEW MONSANTO PLANT

A program for the recovery of several thousand tons of scrap metal from a former pipe foundry plant at Addyston, Ohio, is now underway, Monsanto Chemical Co. has announced.

Plans to recover the scrap were reported by William T. Dickens, manager of Monsanto's new Plastics Division plant near Cincinnati. The company purchased the 115-acre site of the U. S. Pipe and Foundry Co. early this year.

Successful bidder for the project, Kulka Industrial Corp., Alliance, Ohio, estimated there was an "excellent chance" of recovering between 5,000 and 10,000 tons of scrap metal from the former pipe foundry fill.

The foundry operated at the Addyston location for nearly 75 years, Dickens said. During that time scrap metal was dumped in various parts of the large plant and covered with dirt.

At the same time recovery of the scrap is being made, the plant is proceeding with preparations for installation of plastic manufacturing equipment. Monsanto will produce Lustrex styrene and Resinox phenolic plastics at the Ohio location. Lustrex is used substantially in household appliances, refrigerator parts, and toys. Resinox is an important component of new foundry techniques and has significant applications in the furniture field. Both products are also manufactured by Monsanto at several other plants.

